



# The MINING CONGRESS JOURNAL

Volume 16

JANUARY, 1930

No. 1

## In This Issue

Advancement in Stabilization  
The Machine Myth



Mining Practice at Bunker Hill & Sullivan  
The Morning Mill  
Integrating System of Car Loading



The Mechanization Program for 1930  
Method and Cost of Mining  
in a 100 Percent Mechanized Mine



The American Mining Congress Convention  
Legislative Review

### Contributors:

Robert E. Tally, F. A. Merrick, U. E. Brown, M. P. Dalton, G. S. Price, Douglas C. Corner, G. B. Southward, W. F. Hazen, E. J. Christy



## 2,211,393 TONS OF COAL ~ ~ WITHOUT A SINGLE FATALITY

- - - - was produced by Mine No. 12 of The Madison Coal Corporation, located in Dewmaine, Ill.

For this achievement the "Mine" was awarded a Certificate of Honor by Joseph A. Holmes Safety Association.

But mining men, everywhere, who know the facts, will honor the steadfast far-seeing Management that places safety above expediency; and insists upon proper procedure being observed at all times and under all conditions.

That Ensign-Bickford Safety Fuse has been largely used at No. 12 Mine since it was first opened in 1920; and that there has rarely been an accident at this mine from the use of explosives, are facts which indicate the inherent safety of "Safety Fuse" when properly handled.

▲  
Do Not "Short Fuse"  
~ Fuse should be cut  
long enough for the  
end to extend well  
out of the mouth of  
the bore hole when  
the primer car-  
tridge is in place.



**THE ENSIGN-BICKFORD CO.**  
SIMSBURY CONNECTICUT





As witness the year just closing, RandS Equipment and Methods have been accorded more than ordinary consideration. Mine operators in all fields have installed a greater quantity of RandS Equipment than in any preceding year. Many have installed and adopted as standard RandS Rotary and Shaft Type Car-Dumpers, Menzies Hydro-Separators, Arms Air Concentrating Tables, Arms Horizontal Vibrating Screens, Marcus Picking Screens and other RandS Designs for other applications.

Nineteen hundred and twenty-nine has been a year of accomplishment, and we look forward with interest to a continued contact with those whom we have been privileged to serve in the past, as well as the formation of new contacts with many other operators during the coming year with a service that embodies the latest developments in coal handling, cleaning and preparing equipment.

**ROBERTS AND SCHAEFER CO.**  
**ENGINEERS AND CONTRACTORS**

PITTSBURGH, PA., 418 OLIVER BLDG. WRIGLEY BUILDING, CHICAGO HUNTINGTON, W. VA., 514 NINTH AVE..

# The MINING CONGRESS JOURNAL

VOLUME 16

JANUARY, 1930

No. 1

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## Practical Operating Men's Department

### METALS

*Mining Practice at Bunker Hill and Sullivan*  
*Milling Practice at the Morning Mill*  
*Integrating System of Car Loading*

### COAL

*Method and Cost of Mining*  
*in a 100 Percent Mechanized Mine*

Published Every Month by The American Mining Congress, Washington, D. C.

*Edited under the supervision of James F. Callbreath, Secretary of The American Mining Congress*

E. R. COOMBES, *Editor*

GUY N. BJORGE, *Associate Editor*

M. W. KRIEGH, *Assistant Editor*

ERNEST H. PULLMAN, *Legislative Editor*

WALTER LUKEL, *News Editor*

NEWELL G. ALFORD, *Associate Editor*

F. E. PRIOR, *Art Editor*

J. M. HADLEY, *Production Manager*

J. R. HURLBURT, *Advertising Manager*

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# ROEBLING

## "Blue Center" Steel Wire Rope

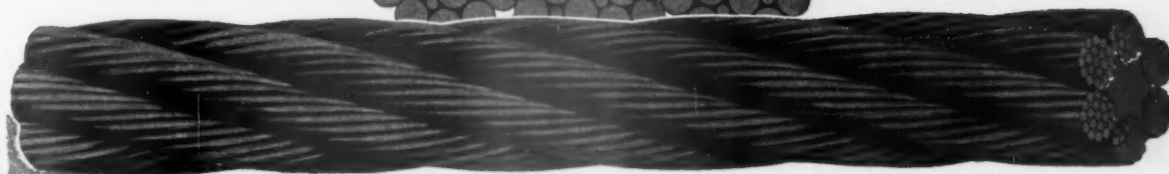
When maintenance cost is lowered and capacity is increased at the same time, every executive and operating engineer is interested in the product which produced these results.

Because of its superior quality, Roebling "Blue Center" Steel Wire Rope gives longer life in service and greater working capacity than ropes of inferior material. It reduces the number of replacements and thus lowers the operating cost per car.

Consult our Engineering Department on your Wire Rope problems.

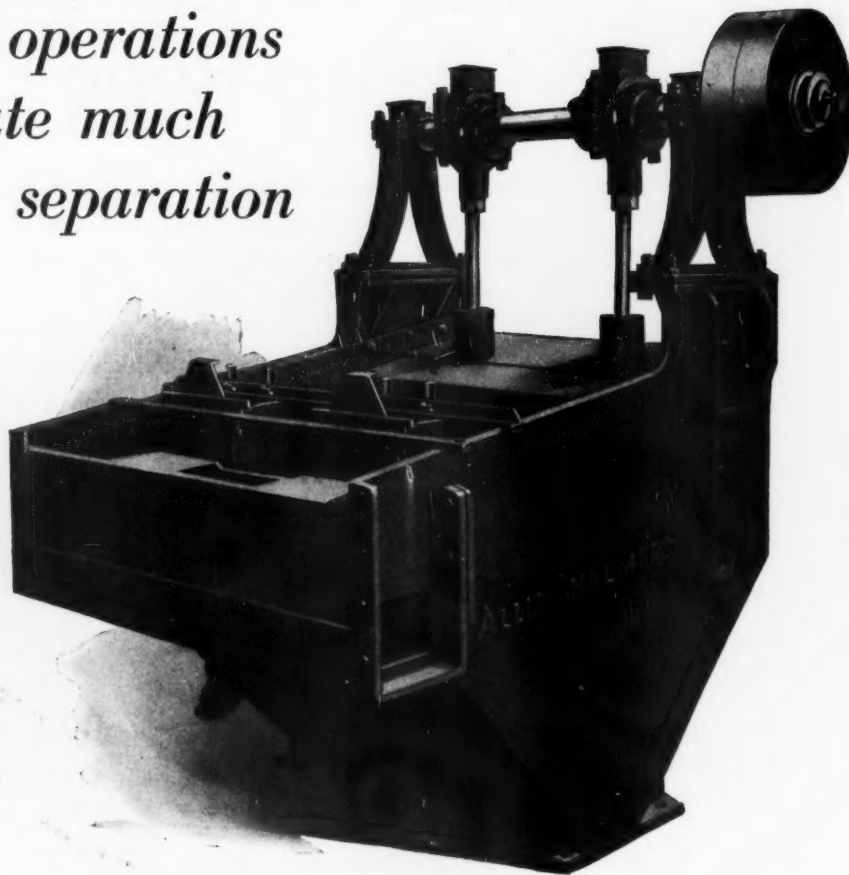
*A Superior Product  
Worthy of Your  
Consideration*

*John A. Roebling's  
Sons Company  
Trenton, New Jersey*



# Woodbury Jigs

*Combine classifying  
and jigging operations  
and eliminate much  
preliminary separation*



48" Woodbury  
Slime Classifier  
and Jig

**THE** economy of the Woodbury System of Concentration consists primarily in the simplification of the processes intervening between the crushing section of a mill and the smelter. Summarized, its advantages are as follows:

**Capacity.**—Units of large capacity, thus retiring a large area of jig sieves.

**Mixed Feeds.**—By uniting the classifying and jigging operations into one, fewer sizing screens and elevators are used, and hydraulic classifiers eliminated.

**Slime Separation.**—A dense original slime, treated direct on tables, retires a large settling tank area.

**Concentrates.**—Recoveries and grade of concentrates are increased.

**Middlings.**—An improved middling classification, reducing quantity to be recrushed.

**Tailings.**—Lower tailing losses obtained in all cases.

**Water.**—Milling water less by one-half.

**Power.**—Costs reduced materially.

**Labor.**—Costs per ton of ore reduced.

**Floor Area.**—Always less, and in some cases cut in two.

**Construction.**—All iron and mechanically correct.

# ALLIS-CHALMERS

MILWAUKEE, WIS. U.S.A.



Jeffrey 8-ton Explosion Tested Locomotive—High Type 34"

## A Totally Enclosed Explosion Tested Gathering Locomotive

All the qualities which the name "Jeffrey" entitles you to expect in a mine locomotive are embodied in this added design achievement of Jeffrey Engineers in gathering locomotives.

Low type only 26" high. High type 34" high.

All electrical parts enclosed in compartments tested against explosion. Where accessibility is desirable, it is obtained through screw type hand holes. All wiring carried in heavy air hose, which terminates in cable shields, bearing on explosion-tested compartments.

Vertical cable reel developed especially for this type. Reel motor with collector rings have their own explosion tested compartment.

Reel motor—of the type to stand it—is thrown directly on the line without resistance, hence there is always power to reel, regardless of voltage.

Cable runs through a trough which extends length-wise of the locomotive, under covers, so cable cannot come in contact with metal parts.

Cable circuit—full metallic—no ground—interlocking transfer switch provides that motors run only in series when on cable.

Control is either progressive series parallel or series and parallel—manual or contactor.

Steel slab frame roller bearings—two powerful motors.

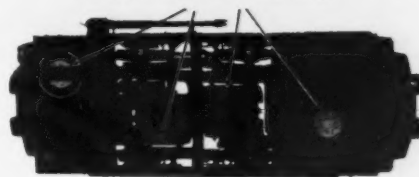
The Jeffrey line of mine locomotives is complete, let us send you literature.

**The Jeffrey Manufacturing Company**  
958-99 North Fourth St., Columbus, Ohio



Jeffrey 8-ton Explosion Tested Locomotive—Low Type—only 26" high.

Screw hand hole covers provide quick accessibility wherever inspection is necessary



Top view showing quality of construction and accessibility



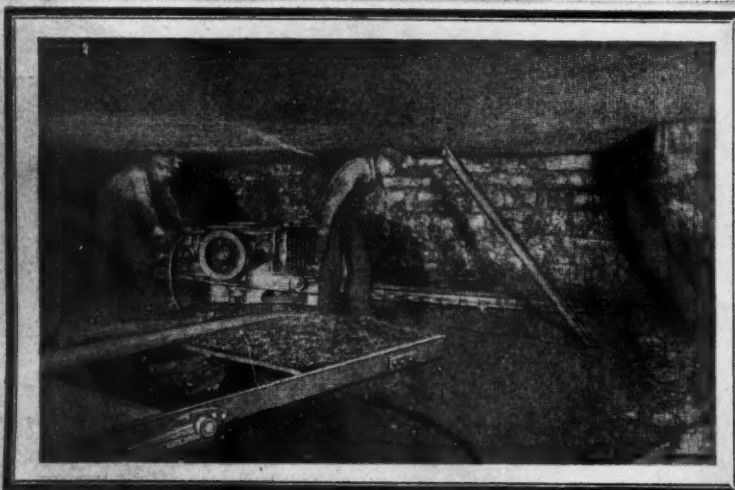
Controller with hand hole open showing type of explosion tested chamber. Controller shown is arranged for contactor control. If desired controller arranged for manually operated control can be furnished.

BRANCH OFFICES: New York Philadelphia Pittsburgh Scranton, Pa. Charleston, W. Va. Chicago Denver Salt Lake City Birmingham  
SALES AND SERVICE STATIONS: Pittsburgh, 600 Second Avenue Scranton, 122 Adams Avenue Terre Haute, Ind., 319 Cherry Street  
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Jeffrey Mfg. Co., Ltd., of Canada. Head Office and Works, Montreal; Branch Office, Toronto; Service Station, 210 Ninth Ave., W., Calgary

# JEFFREY MINE EQUIPMENT

Starting a Cut  
With an A.C. Machine  
In No. 4 Mine

*Goodman  
Shortwall*



**W**hy Spruce River Coal Co.

*Coal Age  
November  
1929*

Beat 148 Others on

**POWER COST**

By J. H. Edwards  
Associate Editor, Coal Age

**B**ASED on per cent of electrification the Spruce River Coal Co., of Ramage, W. Va., has the lowest power cost per ton in a tabulation of 1928 power data for 149 progressive companies which purchase power and operate principally in the area comprising West Virginia, Kentucky, Tennessee and Virginia.

\*\*\*

Undercutting is done with Goodman shortwall machines. \*\*\*

The all 'round efficiency of Goodman Shortwall Machines, which assisted in establishing this phenomenal record, is built also into the—

### Three Types of Goodman Slabbing Machines

1. The Standard
2. The Low Vein
3. The Mounted Bottom Cutter

All three types cut the face directly from the track. They are self-contained, self-propelled units.

### What Would They Do in Your Mine ?

Our engineers will give you a conservative estimate on the results you might reasonably expect, after examination of your conditions. Investigate now!

Builders of Coal Cutting Machines for 42 Years

(14)

**GOODMAN** MANUFACTURING COMPANY  
Locomotives - Loaders - Coal Cutters  
HALSTED ST. at 48TH.  
CHICAGO --- ILL.  
PITTSBURGH - WILKES-BARRE - HUNTINGTON, W. VA. - CINCINNATI - BIRMINGHAM - ST. LOUIS - DENVER - PRICE, UTAH





## Skinny Likes Jeffrey 29-C Telescopic Cutter Head Support

**SKINNY:** That telescopic cutter head support is sure a peach; you can raise the cutter bar to clear the track and not make the machine any higher. Over at the Roaring Canary mine they sure would wish to have this kind of a cutter head on their machines so as to keep it down when traveling.

**BILL:** Well, they can buy that kind of a support and put it on their old machines; it fits exactly in the same place; all you have to do is bolt it on.

**SKINNY:** When I go over there the next time I will tell them about it; I haven't been there since I went over there to the wooden wedding.

**BILL:** Whose?

**SKINNY:** A couple o' Poles got married. An' when the celebration was over and I got home along about 4 GM, the front door was locked. The kid was in the downstairs room an' I said "Jimmie, open the door for your poor, tired Pa, Ma's locked me out"; an' Jimmie said, "Well, she's locked me in and I wanna get out."

*The Jeffrey 29-C Arcwall Coal Cutter and other Jeffrey Mining Equipments are completely described in Catalog No. 475-C. May we send you a copy?*

**The Jeffrey Manufacturing Company**  
958-99 North Fourth St., Columbus, Ohio

BRANCH OFFICES: New York Philadelphia Pittsburgh Scranton, Pa. Charleston, W. Va. Chicago Denver Salt Lake City Birmingham  
SALES AND SERVICE STATIONS: Pittsburgh, 600 Second Avenue Scranton, 122 Adams Avenue Terre Haute, Ind., 319 Cherry Street  
Birmingham, 1911 Avenue A Winchester, Ky., 122 North Main Street Salt Lake City, 153 West Second South Street  
Jeffrey Mfg. Co., Ltd., of Canada. Head Office and Works, Montreal; Branch Office, Toronto; Service Station, 210 Ninth Ave. W., Calgary

# JEFFREY COAL MINE EQUIPMENT

## A Copper Steel Tie for Every Purpose



M19A TIE is designed for room work. It is only  $11/16$ " deep, and shallow depth is an item of importance in low seams of coal. Its width of  $4\frac{1}{4}$ " provides a substantial bearing surface. A workman can easily carry a bundle of six as M19A weighs only  $2\frac{1}{2}$  pounds per foot. The illustration shows No. 26 rail clip inside and No. 26 AA outside. Arrangement and type of clips are optional.

M26A is our most popular general purpose tie and is of the same design as M19A, but larger and heavier.  $13/16$ " deep,  $4\frac{3}{4}$ " wide,  $3\frac{1}{4}$  pounds per foot. Double clips No. 26K are shown with this tie. However, either M19A or M26A are supplied with single or double locking clips as preferred.

M20 TIE is designed for more permanent track in main entries. M20 is 2" deep, 6" wide, and weighs 6 pounds per foot. This same type is available in two other weights: M18— $1\frac{1}{2}$ " deep, 5" wide, 4.2 pounds per foot, and M27, described below. No. 23 rail clips, inside and out, are illustrated. These clips are separate from the tie. Locking clips, riveted on, can be furnished.

M27 TIE is for heavy duty service.  $2\frac{1}{4}$ " deep, 7" wide and weighing 9 pounds per foot, this tie will accommodate rails up to 85 pounds per yard. The recent trend toward heavier equipment has made M27 widely popular. Ends may be crimped on any Carnegie Ties if desired. No. 23 inside clip and No. 120 outside clip are illustrated.

All Carnegie Ties are made of Copper Steel, thus greatly retarding corrosion and insuring the maximum length of service. A copy of our Light Rail and Mine Tie Catalogue will be sent at your request.

### CARNEGIE STEEL COMPANY

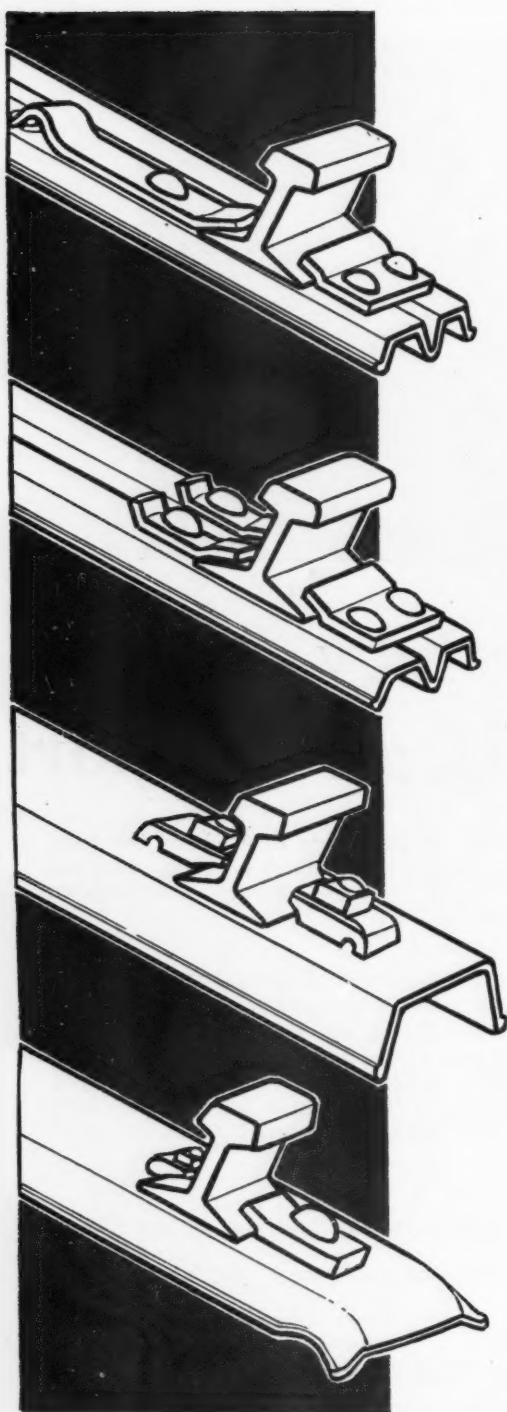
Subsidiary of United States Steel Corporation

PITTSBURGH, PA.

20

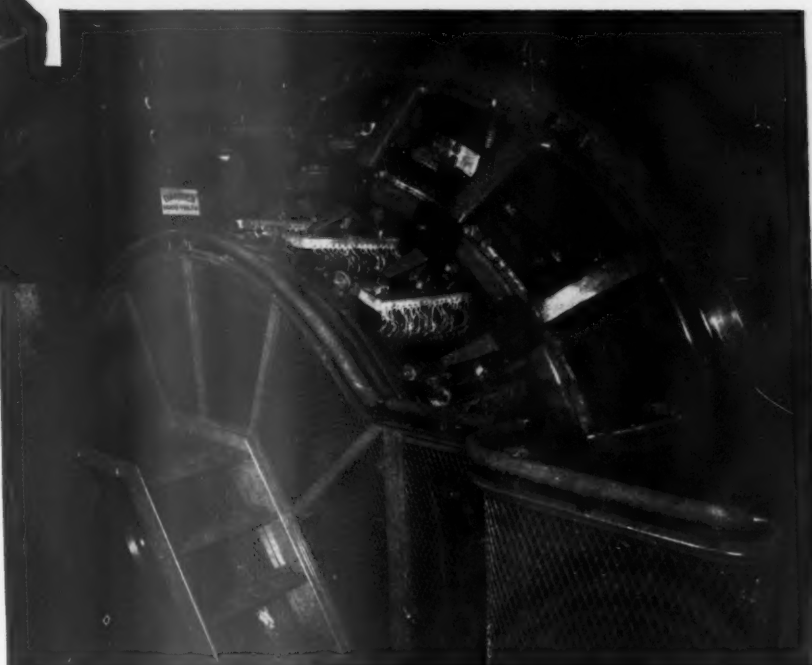
# CARNEGIE

## COPPER STEEL MINE TIES





Above. An Edison 250-light type K generator in use from 1883 to 1928. Equipped with copper leaf brushes.



At right. Modern 4200 KW Rotary Converter, 285 volts, 14,800 amperes. Equipped with National Pyramid Brushes.

THE past fifty years have witnessed tremendous changes in the design of electrical machinery for the supply of direct current. Throughout these years, National Carbon Company, Inc., has been an outstanding leader in developing new and more efficient carbon brushes for the successful operation of these machines.

When the incandescent lamp was in its infancy, the Edison generator illustrated above was used as the source of electrical power. This generator was belt-driven from a steam engine. Its approximate capacity of 25 kilowatts was considered high.

Compare this with the methods of today. Most direct-current power in use today is initially generated as alternating current, often by units with a capacity of over 100,000 KVA. It is transmitted at high voltage to sub-stations where it is transformed to lower voltage and converted to direct current by means of huge rotary converters. The modern rotary converter illustrated herewith is a typical example.

The various designs of machinery necessary for

the collection and redistribution of electrical energy in this highly efficient way would be impossible without carbon brushes. Scientific research in the up-to-the-minute Research Laboratories of National Carbon Company, Inc., always has kept (and still keeps) pace with the ever-changing demands placed on the many types of carbon brushes required.

Engineering science in our laboratories and carefully supervised workmanship in our factories are maintaining for National Pyramid Brushes the leadership established through the years.

**NATIONAL CARBON COMPANY, INC.**

Unit of Union Carbide  and Carbon Corporation

Carbon Sales Division



Cleveland, Ohio

Branch Offices and Factories

New York Pittsburgh Chicago Birmingham San Francisco

# VULCAN



## MINING EQUIPMENT

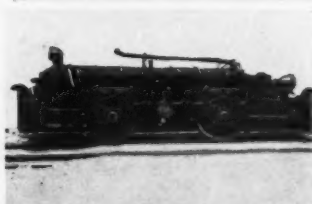
### FOR 1930

#### HOISTS



Double Cylindrical Drum Shaft Hoist, shown here. All types of hoists from large shaft to room hoist furnished. Send for special catalogs.

Vulcan haulage equipment includes electric, steam and gasoline locomotives, larry cars, etc., in all sizes. Efficient three point suspension. Send for special catalogs.



#### HAULAGE

#### CONVEYORS



The Vulcan Shaking Chute Conveyor is unusually adaptable and flexible. Low in first cost and maintenance. Send for special literature.

The Vulcan Scraper loader is adaptable to any system of mining. Let us send you literature about this economical method of loading.



#### LOADERS

#### VENTILATION



This 12 foot diameter 7 foot wide exhaust fan built for a large Pennsylvania mine. All types of fans successfully installed. Send for special catalog.

Vulcan Coal Crushers are simple and rugged. Correctly designed for the most economical crushing. Sheet steel housing gives maximum strength. Send for details.



#### CRUSHERS

Send for catalogs of these or the many other types of mining and preparation equipment we build.

VULCAN IRON WORKS, WILKES-BARRE, PA.

**BUILD FOR 1930 ON THIS SERVICE BACKED BY OVER 80 YEARS EXPERIENCE**



## A coal cleaning system that makes large capacity possible in single units



ROTARY CAR DUMPER



RETARDING CONVEYOR



CAR HAUL



COAL CRUSHER



SHAKER SCREEN



VIBRATING SCREEN



LINK-BELT-SIMON-CARVES WASHERY



LOADING BOOM



PICKING TABLE



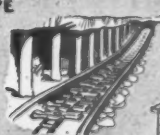
LOCOMOTIVE AND CRAWLER CRANE



KANGAROO CONVEYOR



ROLLER CHAIN DRIVE



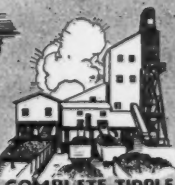
CHAIN CONVEYOR



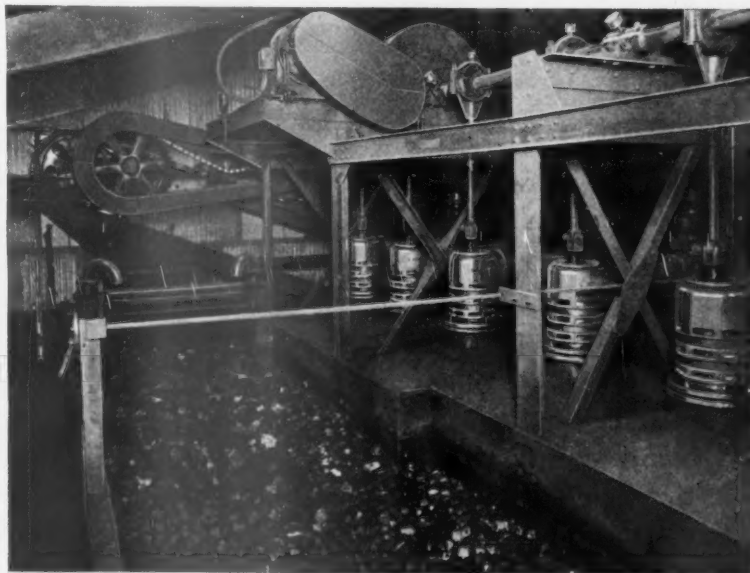
BOX CAR LOADER



BELT CONVEYOR



COMPLETE TIPPLE



THE low capital outlay and low operating expense of the Link-Belt Simon-Carves Coal Cleaning System are both a result of the large capacity attained by this system.

Formerly, with systems then prevailing, a capacity of 50 tons per hour was considered high, but the Simon-Carves has established a new standard of capacity measurement because a single unit of this system will wash 150 tons or even more per hour.

This is done previous to classification, handling all sizes of coal from the maximum size economically advisable to wash, and down. With this system coal is handled, washed, drained, and sized without loss of good coal.

LINK-BELT COMPANY

3824

300 W. Pershing Road, Chicago

Offices in Principal Cities

# LINK-BELT

## SIMON-CARVES WASHERIES

# CONTINUOUS SERVICE



## Shaker CONVEYOR

More than 400 Cosco Conveyor installations in American coal mines —and every one performing continuously and successfully.

That is an eloquent testimonial to the correctness of Cosco design and the thoroughness of Cosco manufacture.

The Cosco Shaker Conveyor equipped with the "Duckbill" increases output per man and lowers maintenance costs to such a degree that losses easily change to profits.

Cosco's small first cost is soon saved by economies it makes possible throughout your mining operations. It can be applied under roof conditions where no other system can be used. It is the most elastic and most readily movable conveyor system known.

Built from American materials to American standards for American conditions.

Let our engineers present facts and figures on what the Cosco A-20 or B-15 Drives and Troughing can accomplish in your mines.

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299 Broadway, New York

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Knoxville, Tenn., 2725 Magnolia Avenue.

Salt Lake City, Utah, Salt Lake Hardware Co.  
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Pittsburg, Kansas.

**"Convey Your Coal The Cosco Way"**

# Announcing THE NEW O-B Automatic D.C. MOTOR STARTER!



**The First Motor Starter to be Conceived, Designed, and Manufactured from the Mining Man's View-point.**

## Seven Reasons Why Mining Men are Buying O-B Automatic D. C. Motor Starters

- 1** This New, D. C. Starter is designed especially for mine service, and therefore is particularly fitted to give better service for the conditions peculiar to mining.
- 2** In addition to the regular starting mechanism, the O-B Starter includes a circuit breaker for protecting the motor.
- 3** The O-B Starter, including the circuit breaker, sells at a price comparable to that which is usually asked for the starting unit alone.
- 4** O-B Starters (D. C.) hold in the running position even though the voltage is as low as one-fourth normal value.
- 5** The parts are few and sturdily constructed. This simplified design reflects its worth by staying on the job, by lowering the cost of maintenance, by minimizing repairs and adjustments.
- 6** O-B Starters are equipped with a low-voltage release mechanism which returns the starter to the starting position at the failure of voltage, and again automatically starts the motor when voltage returns.
- 7** O-B Starters (D. C.) will start the motor and will complete the starting cycle even though the line voltage is as low as one-half normal value.

**D**RIPPING water, dust, low voltage, and a score of other complications constitute conditions under which motor starters must operate in mines; conditions unlike those found in any other industry. Starters are usually designed to operate under the more ideal conditions of other industries; and mining men have been forced to take such devices designed to operate where it is dry; where the air is clean and the voltage good, and to adapt them to their own conditions of dripping water, dust, and what-not. Is it any wonder the adaptation falls far short of being successful?

But now for the first time the mining field has a starter developed particularly to fit its conditions. The O-B Automatic D. C. Mine Motor Starter is strictly a mining starter. Men who intimately know and understand mining conditions have designed it. They have kept it simple. They have added simple, adequate and effective means for protecting the motor from overloads. They have considered and provided for the extreme voltage variations peculiar to mines. In fact they have combined so many new features in the O-B D. C. Starter, that you surely will wish to profit by its advantages in your everyday operation. Turn to pages 20 and 21 of the O-B New Products Supplement No. 3. Send for Booklet No. 568M, describing this Starter in detail.

Ohio Brass Company, Mansfield, Ohio  
Canadian Ohio Brass Company, Limited  
Niagara Falls, Canada  
1157M

**Ohio Brass Co.**

NEW YORK	PITTSBURGH	PHILADELPHIA	BOSTON
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PORCELAIN INSULATORS  
LINE MATERIALS  
RAIL BOARDS  
CAR EQUIPMENT  
MINING MATERIALS  
VALVES





## A PERMISSIBLE FOR EVERY PURPOSE

**L**OW strength, high strength; slow or fast action; high count, low count—the nine Hercules permissibles listed here contain these qualities in the degrees required to meet every coal blasting need.

Regardless of conditions in your mine, there is a Hercules permissible which will shoot your coal the way you want it shot. Check and mail the coupon for complete information concerning the permissibles in which you are interested.

## HERCULES POWDER COMPANY (INCORPORATED)

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CHICAGO  
DENVER

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SALT LAKE CITY  
SAN FRANCISCO  
WILKES-BARRE

### The Permissible For Your Coal Is In This List

**HERCOAL-F:** The new type lump producer. A very high cartridge count permissible (about 500)\* with black powder action.

**HERCOAL-D:** This Hercoal lies between F and C in count (about 450), and like them is a black powder action, lump producer.

**HERCOAL-C:** Another black powder action, lump producing permissible. Lower count (about 400), and stronger per cartridge than Hercoal-F.

● ● ●

**RED H F-L. F.:** Slow and strong with a cartridge count of about 356. A lump producer.

**RED H D-L. F.:** Slow and strong. Cartridge count around 316. Another lump producer.

**RED H C-L. F.:** Slow and strong. About 276 count and a lump producer.

**RED H B-L. F.:** A fast, dense, strong permissible of about 280 count with a smashing action.

● ● ●

**COLLIER C-L. F.:** Fast and strong but with higher count (about 320) than Red H B-L. F.

**HERCOGEL:** Dense and strong. Suitable for wet work. Count about 190.

*\*Note:* Cartridge counts refer to the number of 1½" x 8" cartridges in 100 lbs. of explosives.

● ● ●

HERCULES POWDER COMPANY  
(Incorporated)  
990 King Street, Wilmington, Delaware

Gentlemen: Please send me pamphlets describing the Permissible explosives checked.

☐ Hercoal-F ☐ Hercoal-D ☐ Hercoal-C  
☐ Red H F-L.F. ☐ Red H D-L.F.  
☐ Red H C-L.F. ☐ Red H B-L.F.  
☐ Collier C-L.F. ☐ Hercogel

Name.....  
Company.....  
Address.....



**ONE FOURTH**

*of all the*  
**MECHANICALLY  
CLEANED  
BITUMINOUS  
COAL TONNAGE**

*in the*  
**UNITED STATES  
DURING 1929  
WAS PRODUCED**

*by the*  
**RHEOLAVEUR**  
**COAL CLEANING PROCESS**

**KOPPERS-RHEOLAVEUR COMPANY**  
KOPPERS BUILDING · PITTSBURGH, PA.  
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# DO IT BY OXWELDING

**A**s pioneers in every phase of oxy-acetylene welding and cutting, the thoroughly experienced engineering and service organizations of these companies can help you in the proper application of oxwelding to your present work and to new production activities.



**Fulfilling every need for Oxwelding and Cutting.....**

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The Linde Air Products Company

## *Prest-O-Lite*

Dissolved Acetylene

The Prest-O-Lite Company, Inc.

## *Oxweld*

Apparatus and Supplies  
Oxweld Acetylene Company

## UNION CARBIDE

Union Carbide Sales Company

Units of

## UNION CARBIDE AND CARBON CORPORATION

General offices

UCC

Sales offices in

40 East 42nd Street  
New York, N. Y.

Principal cities  
throughout the country

64 Linde plants 45 Prest-O-Lite plants 154 Oxygen Warehouse stocks 138 Acetylene Warehouse stocks 38 Apparatus Warehouse stocks 235 Carbide Warehouse stocks



## The Right Motor for Your Compressor

The right motor for your compressor is one that is engineered for it. That is what General Electric offers in its synchronous-motor drive.

Direct drive is recommended because it is compact and economical, saves floor space, and reduces power losses.

Synchronous motors are recommended because they are best adapted for direct drive.

They improve power-factor *all the time* and operate with high efficiency at low speeds.

G-E synchronous motors have an added advantage—they are designed for the compressor. General Electric engineers, cooperating with manufacturers, study each compressor and build the motor to fit it. This is G-E Motorized Power—fitted to compressor needs.

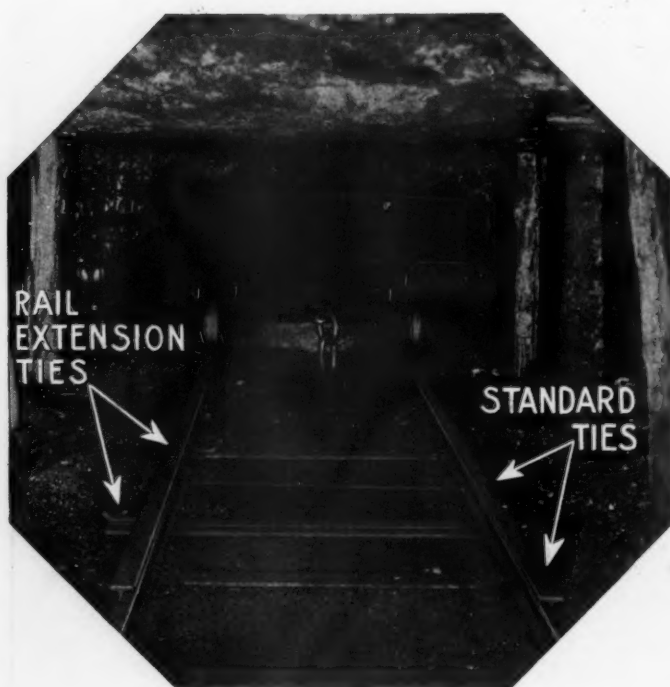
 **Motorized Power**  
*—fitted to every need*

# GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

107-34

# This *rail-extension* tie increases loading efficiency



*This track has been extended close to the working face by using Bethlehem Rail Extension Ties. Where the permanent rails and the inverted extension rails overlap, a special extension tie is used between the last two permanent ties, making a firm joint.*

**L**OADING operations in rooms close to the working face are speeded up and output increased by using Bethlehem Rail Extension Ties. Where these ties are used to extend track in rooms, mechanical loaders and cars may be kept close to the face and moved in as the room is loaded out.

Temporary track laid with Bethlehem Rail Extension Ties and inverted rails provides a firm base for track-type coal cutting machines and may be quickly extended to keep pace with cutting operations. The inverted extension rails are as strong as the upright permanent rails and are securely attached to them by the heavy steel clips of Bethlehem Rail Extension Ties.

Each tie is equipped with two broad stationary clips, and two movable clips which fit snugly against the web of the inverted extension rail. A blow with a hammer drives each movable clip into position and securely attaches the tie to the inverted rail.

A special rail extension tie, having two movable clips, is used between the last two ties of the permanent track, holding the temporary rails tightly against the permanent ones and making a firm joint. Wheel treads of loading machines and loaded cars ride downward off the base of the inverted extension rail instead of upward, over the joint. Thus less effort is required to move the cars, and a strong, economical installation provided.

## BETHLEHEM STEEL COMPANY

General Offices, BETHLEHEM, PA.

### DISTRICT OFFICES

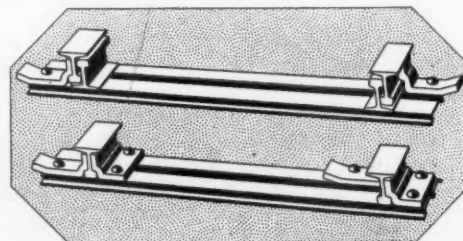
New York	Boston	Philadelphia	Baltimore	Washington	Atlanta
Pittsburgh	Buffalo	Cleveland	Detroit	Cincinnati	Chicago
San Francisco	Los Angeles	Seattle	Portland	Honolulu	St. Louis

Bethlehem Steel Export Corporation, 25 Broadway, New York City.

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# BETHLEHEM

## RAIL EXTENSION TIE

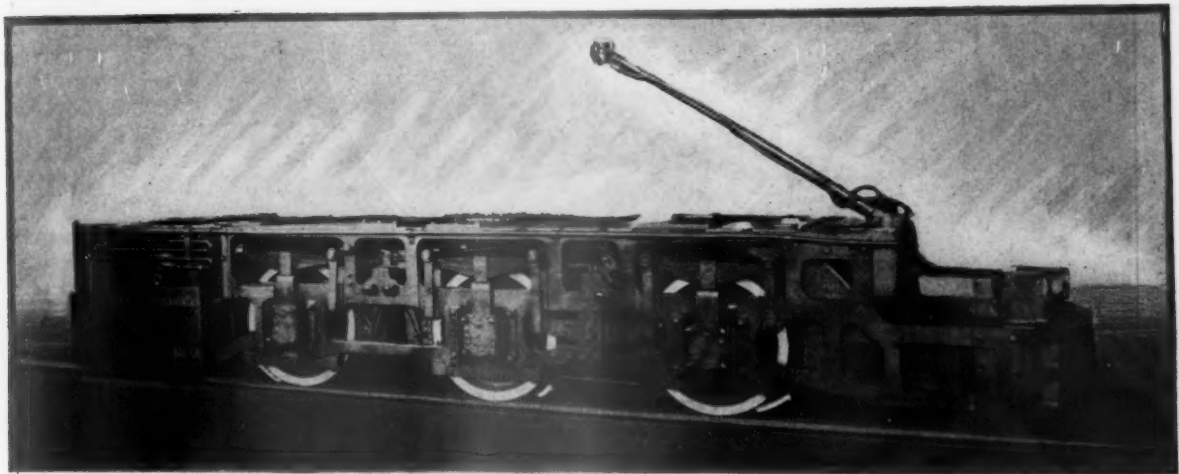


*The lower tie is the one used in the extension track; the upper tie, with two clips, both of which are movable, is used between the last two ties of the permanent track, where the permanent rails and inverted extension rails overlap.*



# Heavier Loads at Higher Speeds

**M**AKING possible greater tonnages per train at higher train speeds, Baldwin-Westinghouse three-axle, super-powerful locomotives reduce operating costs and, where conditions permit, increase production.



30-ton Baldwin-Westinghouse Super-powerful, three-axle, haulage locomotive of the New River & Pocahontas Consolidated Coal Company.

The 30-ton super-powerful locomotive, shown in this advertisement, is equipped with three low-speed, high-torque motors of 112 horsepower each, developing a drawbar pull of 15,000 lb. at a speed of 7 miles per hour.

Other equipment includes Timken roller bearings on the main journals and motor shafts, electro-pneumatic control, and straight air brakes. An important feature, which insures better tracking characteristics, is the three-point suspension of all spring-borne locomotive weight, provided by side and cross equalization.

An experienced Westinghouse engineer, who is available at the nearest district office, will be glad to consult with you on your mine haulage problems.



THE BALDWIN LOCOMOTIVE WORKS  
PHILADELPHIA PENNSYLVANIA

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY  
EAST PITTSBURGH PENNSYLVANIA

# Baldwin-Westinghouse

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# ANACONDA USES HUM-MERS



ANACONDA has found many uses for Hum-mer Electric Screens in its various plants and subsidiaries.

The speed, the dependability, and the low cost of Hum-mer screening, has put this machine in the largest crushing and screening plants of the world.

Its clean cut, thorough sorting action and its big tonnage output enables users everywhere to greatly increase production and profits.

Let us show you the benefits of screening your material with the Hum-mer.

Send for the book, "Screening for Profit."

THE W. S. TYLER COMPANY, *Cleveland, Ohio*  
Manufacturers of Woven Wire Screens and Screening Equipment

## HUM-MER Electric SCREEN

(Reprinted from *Engineering and Mining Journal*)

# ADVANTAGES OF JOY LOADING

Advantages of Joy loading include a mechanism that loads continuously. Loading is at the rate of two tons per minute. Machines work from either track or caterpillar tread. They operate easily, under their own power, all movements controlled by one man. Rear conveyor can be swung to a position at right angles to either side of machine; it can also be raised or lowered at will—as can the front mechanism. Construction is so rugged that operating records show a steady average gain per shift for succeeding years from the same machine.

These heavy duty loading machines are flexible and sturdy. They are installed with over fifty different companies ranging in number operated from one to batteries of eighteen or twenty or more. The Loaders are available in two sizes and in open or permissible equipment. Our experienced organization is available for examinations and discussions, estimates of tonnages and costs, instructions to operating crew, and service.

Detailed information will be forwarded upon request.

**JOY MANUFACTURING COMPANY**  
FRANKLIN, PENNSYLVANIA

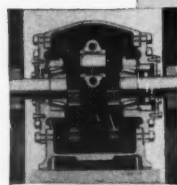


# **JOY LOADERS**

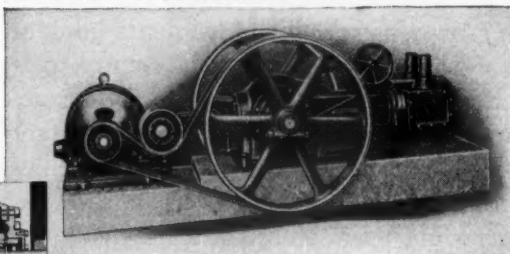
# Now...

## Worthington Horizontal Compressors

... 6-inch and 9-inch stroke



Timken Roller Bearing mounting on crankshaft journals



Timken Bearings require no adjustment for years... an important feature for the compressor user whose equipment is attended by unskilled operators

COMPRESSOR users will readily appreciate the significance of this announcement... it means that they can now have the reliability and efficiency of Worthington Feather Valve Compressors in combination with the economy, carefree operation and other well-known advantages of Timken Roller Bearings.

This equipment is available in sizes employing 6-inch and 9-inch stroke, in capacities of 100 to 300 cu. ft. per minute.

The adoption of Timken Bearings is evidence of Worthington's policy of incorporating, in all of its products, those features of construction which mean increased satisfaction to the user.

If you are not familiar with Worthington Compressors and their numerous features of advanced design, ask the nearest branch office for full information.

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 Works: Harrison, N. J.; Cincinnati, Ohio; Buffalo, N. Y.; Holyoke, Mass.  
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PUMPS  
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Literature on Request

# WORTHINGTON

## A Timken Advertisement By Worthington

"Increased satisfaction to the user" is the spirit of the message contained in this announcement.

Worthington knows—as every manufacturer of Timken-equipped machinery knows—that "Timken Bearing

Equipped" is a dominant factor in improved performance, reduced costs and greater endurance—for Timken is *the one bearing that does all things well*—whether the loads are all *radial*, all *thrust* or a *combination of both*.

# TIMKEN

TRADE MARK REG. U. S. PAT. OFFICE



# The MINING CONGRESS JOURNAL

A Monthly Magazine—The Spokesman For The Mining Industry—  
Published By The American Mining Congress

VOLUME 16

JANUARY, 1930

No. 1

## Editorials

### Conservation

FEW words in the English language have been used as the basis of large public movements so frequently as the words "conservation" and "efficiency." The words are synonymous, and when used advisedly are correct. Efficiency is the conservation of energy, and upon this theory, conservation is the all-important basis of world advancement. But the popularly used term "conservation" in the public mind is more socialistic than practical. It derived its popularity from Mr. Gifford Pinchot's ill-advised crusade, which had for its purpose the socialistic principle of government control of mineral resources, rather than the prevention of waste. Upon this theory, the leasing system was based, and through it enormous wastes have resulted through overproduction. This is particularly true in the field of petroleum.

The recent recommendation of the Interstate Commerce Commission for consolidation of the railroads into a few major systems would have startled the legislators who enacted the bill creating the Commission. Their purpose in passing this legislation was to preserve competition between each individual railroad line and all of its competitors.

Likewise, the Clayton bill and the Adamson bill had as a major purpose the prevention of consolidations. The Federal Trade Commission was created to prevent unfair methods of competition, and the Sherman Anti-Trust Law was a very necessary and a very wise enactment as applied to all industries dealing with an unlimited supply. The application of this latter law to the wasting industries should be so modified as to prevent, rather than require, waste.

### Stabilizing Mineral Production

AT ITS annual convention early in December, The American Mining Congress adopted a resolution providing for the creation of a committee to develop a plan to "stabilize mineral production." There is much need for such a committee.

It is a long call from the sentiment which enacted the restrictive laws embodied in the Clayton, Adamson and the Federal Trade Commission laws to the recent recommendations of the Federal Oil Conservation Board, and the recommendations of a joint committee representing the Government, the oil producer and the American Bar Association.

This movement, in part, resulted in a state law of California, requiring the various owners of any particular oil pool to limit their production, under a general plan to conserve in the ground the oil which the present market can not absorb, and upon which the costs and the risks of storage are very great.

When the importance of petroleum as a power resource is considered and the statement accepted that in a few years our oil reserves will be exhausted, it seems to be a crime to permit oil which is not needed to be taken from the ground, and it seems

## NINETEEN THIRTY

WE, The American Mining Congress and THE MINING CONGRESS JOURNAL, extend to our cooperators our sincerest wish for a Year of the greatest prosperity, the most complete satisfaction, and the highest attainment of the good things in life.

WE pledge our earnest support in arriving at the solution of the many perplexing problems that face the mineral producing industries. We extend to you our services. And we shall continue in our efforts to secure for mining *Safety* in production, *Efficiency* in operation, and true *Conservation* of our mineral resources.

*The American Mining Congress  
The Mining Congress Journal*

well that the public mind is undergoing a change in its approach to this serious problem. True conservation means the highest use and the least possible waste and particularly applies to our mineral resources which, having been once exhausted, can not be replaced. When we realize that the United States is producing 68 percent of the world's petroleum, that we are using 64 percent at home, and that our total reserves are but 18 percent of the world's supply, it would seem high time that the conservation of petroleum should be taken up as a

serious public question. This means only that waste should be prevented. It does not mean that we should close down all of our own production and draw upon a foreign supply entirely to meet our wants. This approach need not be one of panic, because substitutes for oil as a power-producing agency are plentiful. Bituminous coal, lignite coal, oil shale, each in abundant supply, are at all times available.

In the case of other minerals, copper, silver, lead, zinc and the various metallic and non-metallic minerals, with less available substitutes, are rapidly being exhausted. The present wasteful operation of these minerals and of our coal supply is a matter of grave public concern.

It is hoped that the committee to be appointed for that purpose will be able to work out some plan by which the wasting industries may become less wasteful, the public interests better safeguarded and the future supply of industrial minerals so conserved to be sufficient at all times to support the vast productive industries of the nation.

### **The Clay Tariff**

**I**N failing to grant an increase of \$1.25 per ton on china clay or kaolin, Congress thus far has passed over the opportunity to help an important and growing American industry. The request of the domestic china clay producers is modest. The facts presented by them, and confirmed in the recent report of the United States Tariff Commission, not only demonstrate the need for this increase in the tariff rate but present a situation that ought to command the attention of every proponent in Congress of the protective tariff policy for the upbuilding and maintenance of American industries.

The report of the Tariff Commission shows that in 1927 the approximate consumption in the United States of competitive china clays or kaolin consisted of about 325,000 tons of the domestic product and 339,000 tons of the imported product. This means that domestic producers are only permitted to supply about one-half of the domestic consumption when they should be supplying approximately 80 percent thereof. They have demonstrated their ability to produce in excess of 80 percent of domestic requirements, and under a proper tariff protection they would be able to utilize their idle plant capacity which the record shows is equal to the plant capacity now employed. This would mean additional employment for American workmen and increased pay rolls in the Southern States where this clay is produced.

### **Coating Clays**

**I**T is claimed by a number of manufacturers of book and magazine paper that the better grades of English coating clays are a necessary material for the manufacture of their high-grade products. It appears that the annual imports of English coating clays amount to approximately 80,000 tons. The controversy that has been waged concerning the suitability of domestic clays as a substitute for the English material involves principally the coating clays. But the domestic producers have greatly improved the quality of their coating clays as well as other paper clays in recent years, so that these domestic clays now serve purposes for which they were once considered wholly unsuited, and gradually the domestic coating clays have supplanted or are supplanting the English material in the paper manufacturing industry except in New England territory where the importer of English material enjoys a delivered price advantage. The evidence presented during the tariff hearings clearly shows that most of the 80,000 tons of coating clays imported was used in the North Atlantic States, particularly New England.

### **Supplying the Need**

**D**OMESTIC producers in Georgia, the Carolinas, and Florida have shown that they are able to supply at least 80 percent of the domestic requirements for china clays or kaolin. They are now producing approximately 50 percent of domestic requirements and have an idle plant capacity which ought to be utilized. They have made a considerable expenditure of capital for new plant equipment and have greatly improved the quality of their product, so that now, even with respect to paper coating clays, it can not be contended on the basis of facts that they can not supply a product that can be substituted for the English material. On the contrary, the facts indicate that the domestic producers can supply products that can be substituted for practically every kind, grade or quality of English clay for practically every use; and any exception to this would involve the importation of only a few thousand tons as against 339,000 tons of English china clay imported in 1927.

In such a case as this, with all the facts and arguments in favor of an American industry, it is inconceivable that this Congress will not act favorably upon the modest request of the American producers.

### **Shall British Monopoly Dominate?**

**T**HE report of the Tariff Commission, just released, presents some interesting facts. These are here given with our comments.

(1) "Practically all English clay producers are members of Associated China Clays, Ltd., an association of English clay producers organized to fix prices, maintain clay standards, allocate production, and to control shipments to the various markets." Domestic producers are not permitted by our laws to resort to any such methods.

(2) "In the New England district, where a large proportion of the paper mills are located, Georgia paper clays are, for the most part, at a price disadvantage in competition with the foreign product." This district uses about 30 percent of the kaolin used by the paper industry, according to the Tariff Commission. Inasmuch as many manufacturers of the highest grade papers, located in territory where this price advantage does not exist in favor of the English clays, are using domestic clays exclusively, it would appear that the objections of the New England paper manufacturers to an increased tariff on the principal ground that the domestic clays are not suitable for their purposes, are without foundation.

(3) "The extent to which domestic pottery clays may further substitute for English clays depends largely on how far the objections to the use of southern kaolins can be overcome. English clays have a certain prestige, acquired through years of satisfactory use and domestic users are slow to make a change. \* \* \* Quite a number of domestic potteries which before the war used large quantities of English china clay, have found that domestic kaolins, properly blended, are as suitable for their use as the English product."

(4) It is stated in the Commission's report that "the combined rail and ocean freight charges on English clay from mines to many large consuming points in this district (New England) are considerably less than the domestic rail charge from southern mines." The example given by the Commission, which is no doubt representative, shows a difference of \$2.39 in favor of the English material. The report also compares character of English and domestic deposits and methods of mining and treatment and states that "the costs of the domestic

mining operations are correspondingly higher than those of the English." The low labor cost of mining the English clay is cited as an important factor in this differential.

(5) The protection of \$2.50 granted by the 1922 Tariff Act has not increased the cost of domestic clays to consumers now served by the domestic producers. The report of the Tariff Commission shows that domestic clays are now delivered to consuming points in Maryland, Pennsylvania, West Virginia, New York, Ohio, Michigan and Wisconsin at prices in round figures of from two to five dollars less than the delivered prices of English clays. This shows that the prices of domestic clays are fixed by healthy domestic competition, and that the tariff does not mean an increase but a reduction in the cost to the consumer, especially after the domestic product is established in the home market. With the additional business that would accrue under an adequate tariff, present idle plant capacity would be absorbed, and further reductions in domestic prices naturally follow increased production and sales.

### **A Tariff on Silver**

**I**N the *Congressional Record* of December 21, Senator Key Pittman takes occasion to criticize The American Mining Congress because it has failed to support his proposal for a tariff of 30 cents per ounce on the importation of silver.

The Senator points out that the production of silver in the United States is about 60,000,000 ounces annually, and that the market demand is about 40,000,000 ounces, leaving approximately 20,000,000 ounces of silver now being produced in the United States which must find a market elsewhere. Mr. Pittman tells us that the importation from Mexico and South America is about 100,000,000 ounces, but he does not state that that 100,000,000 ounces of silver largely brought into the United States for treatment is shipped out again to foreign markets, together with 20,000,000 ounces of our domestic production.

During the twelve-year period 1917 to 1928, the imports of silver amounted to \$842,016,655, while the exports were \$1,340,749,503 and our domestic production \$744,268,125. This period included the exports to England under the Pittman Act. During the seven-year period 1922 to 1928, our imports were 476,587,749 ounces, our exports 599,559,489 ounces, and our production 439,621,127 ounces. During the month of November, 1929, 4,387,088 ounces of silver were brought into the United States from Mexico, and during the same month 17,032,388 ounces of silver were exported from the United States, 15,338,423 ounces being exported to China.

Instead of this Mexican silver being in competition with our domestic production, our exports in one month amounted to about twelve million ounces more than our imports and many times more than our domestic production. A large part of the ores carrying these silver imports were brought into the United States to be smelted and refined, thus furnishing employment not only to the men directly employed in the smelting and refining operations but to the miners who furnished the coal and to the various manufacturers of supplies used in the operation and to the railroads which transport these supplies.

A tariff on silver would make it desirable that the smelting operations should be moved into Mexico, in which case our own domestic production would be hampered by a lessening of smelter facilities. The lack of smelting facilities is one of the great handicaps in many

sections of the West where the costs of transportation from the mines to the smelters are almost prohibitive.

A protective tariff is levied upon imported articles in order to prevent these articles with a less production cost from taking the market from the domestic producer. The market price of silver is fixed in London. The domestic price is based upon the London price, and the 40,000,000 ounces of silver which are absorbed in our own industries are sold at a price fixed in London and affected only by transportation costs.

The American Mining Congress has not opposed a tariff on silver. It has not advocated such a tariff because it does not believe that it would be of any value to the silver producer. Whenever the time comes that our domestic market can absorb our domestic production, a tariff on silver will be of service to the industry; but so long as we are exporting 20,000,000 ounces of our own silver, beside all of the imported silver, the tariff would serve no purpose and would violate the fundamental principles upon which a protective tariff is based.

### **Income Tax Administration**

**T**HE reports of the Secretary of the Treasury and the Commissioner of Internal Revenue show that marked improvement has resulted in the administration of the income tax law under the reorganization of the Income Tax Unit and field offices and the changes in policy which were adopted in 1927 and 1928 under former Commissioner David H. Blair. Under Commissioner Robert H. Lucas the task of bringing the work of the Income Tax Unit to a current basis has been performed most efficiently. Commissioner Lucas brought to the Bureau the benefit of many years of field experience as a Collector of Internal Revenue. This, no doubt, is in a large measure responsible for the rapid progress made in bringing the work of the Bureau of Internal Revenue down to practically a current basis in the last few months, and also for the substantial and encouraging progress that is being made toward relieving the congestion of cases accumulated before the Board of Tax Appeals. The reports also show that the handling of cases in litigation has improved satisfactorily, and the number of appeals taken to the Board of Tax Appeals and to the courts has been very materially lessened. The Secretary's report sums up the results as follows:

"The Treasury does not consider that the administration of the tax laws is upon a current basis merely because the work of the Bureau of Internal Revenue is current. From the Treasury point of view no case is settled until a final determination and adjustment of the tax liability has been made and the case closed finally for all purposes, even though a decision of the Board of Tax Appeals or of the courts is necessary. \* \* \* The accumulation of cases before the Board of Tax Appeals has been greatly reduced. The efforts of the Bureau have been directed toward (1) a decrease in the number of new petitions; (2) an increase in the number of cases settled through the special advisory committee; (3) an increase in the number of settlements effected by the review division of the general counsel's office; and (4) the settlement of appeals by other divisions of the general counsel's office."

The reports show that business conditions have been highly satisfactory; and that the prosperity resulting from advancement in production and distribution is reflected in increased wages and profits from industry and commerce. Inasmuch as variations in business and financial conditions are an important factor in determining Federal Budget results, it is noteworthy that income



tax collections have continued to increase, notwithstanding the reductions in rates made by the last revenue act. It remains to be seen whether the recent sharp decline in prices of securities, particularly stocks, will affect the income tax collections during 1930 under the 1 percent reduction authorized by joint resolution of Congress for the taxable year 1929. However, regardless of what may be the result in the future as to income tax collections, it must be observed that efficiency in the administration of the Treasury Department and the Bureau of Internal Revenue has been no small factor in the maintenance of the nation's prosperity. Any serious errors on the part of the Treasury in estimating revenue requirements and prospective revenue to meet those requirements, with a resulting Treasury deficit, might have shaken the business and industrial structure of the country to its very foundations.

These reports are most creditable, and full credit for the efficient management of the Treasury Department and the Bureau of Internal Revenue should be given to the officials responsible for them.

### Future Legislative Problems

THE mining industry is confronted with a number of serious problems. Some of them require legislation for their solution; but the industry has been reluctant to urge consideration of necessary legislation until there is some definite assurance that these problems will be dealt with constructively and conservatively.

With the tariff revision bill before Congress practically every other question of importance to the mining industry has been sidetracked; but if the tariff bill is passed at this session, Congress will have both the time and the inclination to give attention to the mining industry.

Measures should be considered for the stabilization of the mining industry, particularly as to coal and to base metals; legislation is needed for the improvement of economic conditions in gold and silver mining, and especially for the encouragement and stimulation of gold mining; and some change in the income tax law is necessary in order that the "depletion" or "return of capital" provision may apply equitably to all branches of the industry and in the cases of all mining taxpayers. In addition, Congress should make such changes in the public land laws as to permit the freest and largest possible development and exploitation of mineral resources consistent with sound public policy.

Prosperity in mining is essential to prosperity in other branches of industry, and perhaps just as vital to the prosperity of the country as is prosperity in agriculture. It can not be said that agriculture can be prosperous when the mining industry is depressed; and depression or lethargy in the mining industry also has a far-reaching effect upon the profitable operation of the nation's transportation systems as well as of the country's manufactures.

Among the trends in industry considered at the annual convention of The American Mining Congress, that of taxation was given an important place. It was shown that the natural resources and related industries pay in taxes to the Federal, state and local governments a total of approximately eight hundred million dollars, or an amount almost equal to the total cost of the Federal Government prior to the World War. The mining and other natural resource industries can bear this burden of taxation without serious hardship if permitted to

develop and expand and regulate their production coincident with and to meet the needs of changed economic conditions.

### High Grading

HIGHGRADING is a term applied to the stealing of high-grade gold ore from mines and ore treatment plants, and while gold production is now at a low ebb the loss through highgrading is much larger proportionately than in the days when low-grade gold ore was being mined at a profit. With the exception of a very few low-grade gold mines, the most important of which is the Homestake mine in South Dakota, gold mining is now confined to the very high-grade deposits and to placer mining. In placer mining operations—the washing of native gold from gravels—the gold is obtained in an almost pure state and is particularly subject to larceny. This particular method of thievery is filled with romance.

Orders that workmen coming from the mines should be required to change their clothing before leaving the property in order that the high-grade gold could not be secreted and carried away have led to initial strikes which have ended in widespread labor difficulties. The Cripple Creek labor war in Colorado had its beginning in an effort to stop highgrading. The same cause was the beginning of the extended labor difficulties in Goldfield, Nev. Efforts to prevent the stealing of high-grade ore have been defeated by the plea that this particular ore, when attached to the soil was real estate and that as it had never become the personal property of the mine owner it was not the subject of larceny. A number of state laws were enacted to meet this situation. It is a strange anomaly that the United States Mints have been the most important fences in the disposition of gold in spite of every effort on the part of the Government to prevent being so used.

Efforts have been made to secure legislation through which the stealing of high-grade gold ore and bullion could be taken from the jurisdiction of state courts, in which it was difficult to effect a conviction because local juries are frequently composed of one or more members who either are stealing ore or of friends who sympathize with these transactions or of assayers who purchase this ore at great profit or the gambling houses supported by easy money thus obtained. These efforts have been defeated because the granting of such jurisdiction could not be confined to these particular offences and if allowed at all would infringe the police power of the several states.

The venerable lawyer, Judge E. A. Colburn, 84 years old and still driving his own race horses, formerly a large gold mine operator in Cripple Creek, has been the nemesis of the highgrader and has probably secured as many convictions as all others combined; but in spite of his untiring efforts, highgrading still continues, the Mint still buys stolen ore and the difficulties of conviction are so great that the practice is still a great evil notwithstanding the very much reduced gold production.

H. R. 119—the La Guardia bill—designed to prevent the transportation of stolen property in interstate and foreign commerce, recently favorably reported by the House Judiciary Committee, with a slight amendment proposed by Judge William E. Colby, of San Francisco, seems to offer the most effective plan for curbing this nefarious business and will, if enacted, be a particular boon to the gold miners of the West.



# ADVANCEMENT In STABILIZATION

By ROBERT E. TALLY \*

**Proper utilization and conservation of mineral resources a great need—Stabilization offers practical means for elimination of uneconomic production and adjustment of supply to demand**

**T**HE GREATEST SERVICE that the American Mining Congress can render to the mining industry and to the nation is cooperation directed to the proper utilization and conservation of the country's mineral resources.

The development of these resources, and the manufacturing and marketing of the products thereof have been and are important factors in the prosperity and prestige of this country.

It is a well known fact that minerals, when mined or otherwise extracted, can not be replaced, but it is not generally known or appreciated that the nation's mineral resources are being rapidly reduced, and in time will become exhausted, thereby making future mineral requirements dependent on foreign production, which is an unsound position for a manufacturing nation.

It is, therefore, important to conserve these resources for the useful needs of industry and to encourage the development of additional reserves as needed to meet the requirements of the future.

Such conservation is the key to stabilization. It offers a practical means for the elimination of uneconomic production and for the adjustment of supply to demand. A sound conservation policy must be based on facts. It requires just consideration for the interests of consumers and genuine cooperation by producers, as well as a helpful and sympathetic government. Producers must know that the need to conserve is real and that without conservation their resources will be depleted without adequate financial returns. The producer must also know that his action in connection with conservation, through collective curtailment is within the law and that he will not be

harassed by governmental investigations.

Conservation in the mineral resource industries is the only practical solution for overproduction. If these resources could be replaced the need for national conservation would not exist. However it should not extend to the stage where high cost production will be made attractive. Low grade ores should be conserved for the improved mining, metallurgical and manufacturing methods of the future. Fair metal prices should be the deciding factor, and mines that can not compete under these conditions should await a future position in the history of the industry.

Conservation will fail if misused in the maintenance of unreasonably high prices and the restriction of competition. It will also fail unless producers cooperate in the adjustment of supply to demand and unless collective curtailment without abuses, and without govern-

mental regulations, is made permissible. Excessively high prices restrict consumption, and reasonable competition is helpful to producers as to consumers.

The coal, iron, copper and zinc mines have been developed beyond consumptive requirements, resulting in overproductive capacity. Under these conditions there is a natural inclination to excessive production. Operating costs are lower when operating at or near capacity, but if the industry in general follows the maximum production theory, overproduction, with low metal prices, low wages and inadequate earnings, will result.

Individual producers hesitate to curtail production, thereby increasing their costs, as compared with competitors operating to capacity. Collective curtailment is the remedy for overproduction, and should receive the approval of, and be encouraged by, the Federal Government.

The present period in the history of mankind has been termed the "Steel and Electrical Age." This term is the result of the many new uses for, and the very large increase in the consumption of, steel and electricity, and suggest foresight in the conservation of the iron



500 level Surface Plant, United Verde Mine, Jerome, Ariz.

\* General Manager, United Verde Copper Company, and President of The American Mining Congress.

Presented to 82d Annual Convention of the American Mining Congress, Washington, D. C., December 4-7, 1929.

ore and fuel from which steel and electricity are made.

The future expansion in the production of electric power will be largely from fuel, as most of the low cost hydroelectric projects have already been developed. Improvements in the design of steam boilers and turbines, together with the more efficient use of gas, oil and pulverized coal are responsible for power costs comparable with those furnished by low cost hydroelectric plants. This condition demands the conservation of the fuel resources for the requirements of the future.

Large amounts of copper will be needed for the future industrial expansion of the nation, and the domestic copper resources are not large. The same condition exists in connection with the zinc resources. Both of these industries have been over-developed, and while there has been some individual curtailment, it has not been altogether effective.

The copper industry, which has been noted for its many peaks and depressions, has not fared well since the war. The average price of the metal for the last five years, including the favorable year 1929, has been slightly less than for the 20-year pre-war period, while the large items entering into the cost of production have been much higher.

The copper industry has the courage to take advantage of periods of depression to prosecute its research, development and construction campaigns.

Wages in the industry are based to some extent on the price of copper, with the result that the producer feels obligated to maintain present prices, not only from the standpoint of earnings and conservation but also in order to maintain the present high scale of wages with the consequent high standards of living to which the employee is entitled.

It is believed that this feeling toward the employee is typical to the mining industry in general.

While there has been some curtailment in mining, there are very definite signs of overproduction at the present time, and this will require a more drastic readjustment, otherwise prevailing prices can not be maintained.

Overproduction in an industry disrupts the entire economic structure of that industry, and if this condition is extended to industry in general the business of the country will suffer to the extent of a depression.

The aim of industry is stabilization, or the adjustment of supply to demand, with well directed efforts to increased demand. The producer is entitled to fair returns on his investment and on the risk involved, the consumer to receive his product at reasonable prices and under com-

petitive conditions, the employee to be paid high wages.

The President of the United States is now engaged in a program for the stabilization of American business. In this work he is receiving the active aid and cooperation of Federal, state, county and municipal administrations throughout the United States and of the nation's industrial and financial leaders.

The purpose of these extraordinary efforts is to minimize the effects of what appeared to be an imminent and general business depression, caused primarily by overproduction, overextension of credits and harmful competition, accentuated by the apparent reduced purchasing power of a large number of people.

It is probable that this experiment will be the beginning of a permanent plan to stabilize American business and it deserves continued and wholehearted national support.

The most urgent need of the mining industry is stabilization on the basis of fairness to the various interests involved. On no other basis will it permanently succeed.

The American Mining Congress was organized primarily to assist the mining industry in the solution of its national problems, and it welcomes the opportunity to cooperate with all industry in developing plans not only for the stabilization of mining but for American business in general.

#### EUROPEAN ZINC CARTEL DISCONTINUED

The Department of Commerce has been advised that the international zinc cartel will be discontinued after December 31, 1929. Decision to abandon the group was reached when there appeared to be slight possibility of a compromise among opposing factions of the organization, which was formed in May, 1928.

Prior to its establishment, opinions were expressed in European metal circles that the purpose of the cartel could not be accomplished without the cooperation, as members, of American slab zinc producers who control 45 to 50 percent of the world output of zinc. So far as known, producers operating within the United States were not associated actively with the cartel, which included the principal producers of Belgium, France, Germany, Poland, Spain, Italy, and the Netherlands who exchanged production and stock statistics through a central bureau of statistics which issued a bi-monthly statistical service giving in detail production and stock figures of participating companies. On the basis of these data, price fluctuations were to be considered and measures taken toward stabilizing output.

#### COAL CARTEL DISCUSSED

In discussing the possibility of an international coal cartel, J. R. Bradley, chief of the coal section of the Department of Commerce, says:

"If it becomes possible to reach something like a parity of wages and length of the workday in the chief European coal-mining countries—a matter which continues to receive the attention of the League of Nations—an international coal cartel may be organized which would allocate quotas and regulate prices, and thus tend to prevent the uneconomic sale of coal in world markets and help to level the peaks and valleys so common to the industry. A real contribution, beneficial alike to the shipper and consumer, might result if costs of transportation should be reduced by having the various markets supplied by that exporting country from which transport costs are least. Because of the potential ability of certain other countries to export coal, and because of the possible substitution of other sources of heat and power for coal, the cartel apparently would be unable to charge exorbitant prices."

#### GEOLOGICAL SURVEY REPORTS ON MINERAL LEASES

The Geological Survey reports that up to October 1, last, rights to prospect or develop publicly owned mineral deposits had been granted by the Government to 38,810 parcels of land, distributed over 15 western, 5 southern and 1 central state and Alaska. Rights were effective, however, on only 11,731 tracts. Of these 922 were producing, 10,786 were segregated for prospecting and 100 were in process of acquisition by mineral discovery. For coal 23 licenses and 293 leases were producing 10,000 tons a day with 240 prospecting permits. Production from leases for oil and gas included 62,000 barrels of oil per day from 2,650 wells; 66,000,000 cubic feet of natural gas per day and 150,000 gallons of natural-gas gasoline per day, with drilling on 600 of 10,429 prospecting permits. There are 20 sodium permits on which operations are in progress on 10 and 1 lease; 97 potash permits on which operations are soon to begin and 4 leases; 3 phosphate leases and an oil shale lease.

The Federal revenue from all the leases amounts to \$350,000 per month.

The Survey notes a consistent increase in coal mining operations on public lands and looks for discovery and lease of oil, gas and potassium before the end of 1931.

During the year ended June 30 last, 8,700 oil and gas prospecting permits were canceled and the campaign of cancellation is still uncompleted. It is said that no activity was begun on 97 percent of the canceled permits, while the 3 percent covered land which failed to show oil or gas.

# The MACHINE MYTH



AS I understand the subject that has been assigned me by your Program Committee, "The Machine Myth," is the idea that has been current for over a century, and is still held by many people today, to the effect that the use of labor-saving machinery tends to decrease the worker's opportunities for employment and to reduce his wages.

This conception is well called a myth, because a myth is essentially an easy-to-believe assumption in place of a reasoned analysis of facts. It was easier for the ancients to invent the myth of Apollo and believe that the sun was drawn across the sky by horses than to work out the true mechanics of the solar system. It was easier for the medieval scholars to deny the Antipodes and devise a mythical geography than it was for them to conceive that there were people who lived on the underside of the earth and who walked around, relatively speaking, upside-down. And it is very easy for those who are not in position to follow the ramifications of a somewhat complicated economic process to believe that machines, which reduce the amount of labor needed to perform certain operations, also of necessity reduce the total amount of labor needed by society.

\* President, Westinghouse Electric & Manufacturing Company.

Presented to 32d Annual Convention of the American Mining Congress, Washington, D. C., December 4-7, 1929.

Mechanization of industry one of three great steps forward in mechanical progress—Broad sighted policy in passing on to workers substantial share in increased productivity of mechanization, education, and the abolishment of drudgery in connection with manual labor, eliminating the machine myth.

By F. A. MERRICK \*

This is not to say, however, that every myth is purely a product of imagination. In some of them there is at least slight basis of fact, and the machine myth to a certain extent comes under this classification. It is of the utmost importance that we, who are engaged in developing and extending the use of machinery, should realize this if humanity is to secure the maximum benefit from our work.

## THE MECHANIZATION OF INDUSTRY

I think I am safe in saying that barring those who have a highly developed inventive proclivity, people in general do not love a machine for its own sake. The reason we cultivate our development of such things is that we either must have them or else must resort to the alternative of doing without a service or of securing it in a more laborious way.

A human being that is absolutely dependent upon his own muscles can just barely keep himself alive under favorable circumstances, and to raise himself above the animals he must in some way supplement his own feeble strength. Civilization came into existence because certain strong groups of people used the muscles of men and women of weaker tribes for this purpose; and if there were no machines today there would be no leisure, art, literature, science, or comfort for any one without slavery.

But, fortunately, some one, long before the dawn of history, discovered that it was easier to pry up a rock with the aid of a stick than to lift it up with his hands; and from then on man has always employed tools and machines of some sort to aid him in his struggle for existence.

Thomas Carlyle has defined man as a tool-using animal, and when one thinks of it seriously there is nothing which

differentiates man on the material side of things more than his use of tools.

With every advance in his knowledge he improved his mechanical equipment, making his life a little easier with every advance. This has, in general, been a continuous and steady process; but on at least three occasions the rate of mechanical progress increased with marked abruptness.

The first of these sudden spurts occurred in the early part of the last century, following the general introduction of the steam engine. It took place in England and is known as the "Industrial Revolution."

The second was the direct result of the perfecting of the alternating-current system of electricity. This system made possible the general use of electricity in industrial plants; and because it possesses certain advantages, electric power was speedily substituted for steam in a large number of industrial processes. This movement, known as "the electrification of industry," started in America in the last decade of the last century and has now spread all over the world.

The third change likewise started in America and is of very recent origin. It is due to a number of factors, including the experience of our industries during the World War and the wide vision which characterizes American industrial leaders and workers. It is essentially an extension of the electrification movement, but there is this new element in it:

Heretofore the application of electricity to industry has been more or less of a piecemeal proceeding, a little was done here and a little there; and though this has continued until many of our industries are now considered completely electrified, there is evidence everywhere of a lack of unified development.

The new method which is now attract-



ing world-wide attention under the title of "the mechanization of industry," consists in taking an entirely fresh start and designing the complete equipment of a given factory, mine or other plant to take full advantage of all applicable modern automatic, semi-automatic, and labor-saving devices with the object of reducing the cost per unit product to the lowest possible figure.

A familiar example of mechanization is the automatic telephone. As you know, with a few turns of a dial, we start into operation an intricate machine, which, without human intervention, picks out the one spot in the world we wish to reach and summons some one there to speak with us.

Another example is provided by the most modernly equipped steel mills. On entering such steel mill one is struck by its loneliness. In place of the many men we were accustomed to see toiling in the heat of these places, there are but few operators, and here and there, sitting comfortably in a sort of pulpit, is an operator who controls every stage from the white-hot ingot to the finished structural shape by merely moving a few levers.

There is in New York State an electric railway system supplied with power through five substations. Each one of these substations is automatic in operation and normally carries on its intricate functions without the need of human help. Should, however, an emergency arise, signals are flashed to a central control station, where an operator thus informed of the trouble, presses some buttons and takes individual charge of the situation until the transient condition is passed.

If one were to go into the boiler room of a modern ship, he would find there instead of a hundred grimy stokers continuously heaving coal into the fires, two or three engineers in white uniforms, whose physical exertion is largely confined to reading meters and turning valves.

Other instances could be cited indefinitely, but this is hardly necessary. Naturally, only a small proportion of our industrial processes can be reduced to an automatic basis, but the tendency to go as far in this direction as possible may now be considered to be definitely established. This, in fact, is what is meant by "the mechanization of industry."

Obviously a very considerable saving in labor is being effected in this way. To indicate our accomplishment in this direction, it appears, according to The National Industrial Conference Board, that on the average for all manufacturing industries, an output that required 109 workers in 1900, was produced by 100 in 1914, and by only 71 in 1925. Later statistics are not now available,

but it is certain that this figure for the present time is considerably smaller, and that for certain highly mechanized industrial plants it is very small indeed.

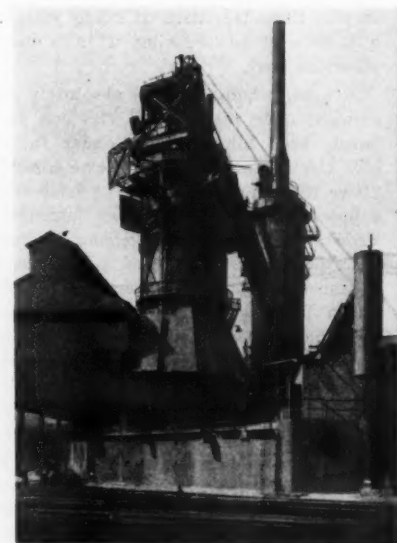
This fact is incontestable—the mechanization of industry is undoubtedly changing the status of employment in the major portion, if not all of the industries. As to the consequences of this fact, there are those who view it with pessimistic forebodings, and those who see in it only the release of mankind from the drudgery of mere muscle wearing toil, and with increasing leisure to enjoy the abundant fruits of his lessening exertions.

Those who take a gloomy view of the machine, who regard it as a veritable "Frankenstein monster," believe that the mechanization of industry will affect us adversely in at least the three following ways:

In the first place, since every time a labor-saving machine is put in operation, it throws a certain number of men out of work, the farther the mechanization of industry is carried out, they reason, the more serious the unemployment situation will become.

Secondly, the mechanization of industry will eventually result in over-production and will ruin business.

Thirdly, the machine is an unnatural soul-and-body destroying thing, reducing the operator himself into a sort of scarcely humanized mechanism, and if we continue to increase our reliance on mechanization at the present rate, civilization and organized society, or at least all its finer human quantities, will eventually be submerged.



"\* \* \* Another example is provided by the most modernly equipped steel mills. On entering one is struck by its loneliness"

To discuss this last point first, the view that the machine is subversive of human welfare is simply shutting of our eyes to the facts about us. After all is said and done man has always used tools and machines and always will, and he will always make more and better ones at every opportunity. It is as useless to advise him, as many have done, to return to hand labor as it is to suggest that he should grow fur or fins. As a matter of fact those who believe the machine to be inherently evil are in much the same class as those who, not so many years ago, saw national ruin in the attempts of the lower classes to educate and advance themselves. One of the products of advancing civilization has always been the greater development and use of tools and machinery, and one of the products of advancing production and use of tools and machinery has been a greater and more stable civilization.

The two things are mutually repulsive and a country in which one is lacking is also backward in the other. This is true at the present time and has been true throughout the ages. True, some of the ancient peoples are to this day held up as examples of a high civilization, but in fact the mental attainments, the leisure, the niceties and even the comforts of life were limited to a very small percentage of the population—the rest were, to borrow again a phrase from Carlyle—"forked radishes fantastically carved."

The other two indictments against the machine—the creation of unemployment and of overproduction—are of a different order. Both of these things may happen in the progress of mechanization, but they are the superficial and incidental efforts in the readjustment period of progress.

And right at this point I would like to say that here lies the origin of the machine myth. It arises from a view which concentrates on the easily discernible transient conditions, while failing to search out the deeper reasoning among the fundamentals. This is, you will note, the basic reason for the origin of all myths, as spoken of in our opening paragraphs. In the case under discussion, however, there is a very human reason for great emphasis on the superficial and transient effects—for no one and no class is in this day and age so hard-boiled as to look on even temporary enforced unemployment without a feeling of distress. Hence the persistence of the machine myth—this and the circumstances of its originally taking form.

Its emergence came with the introduction of steam power and its so-called Industrial Revolution already referred to. The only industrial development of any moment was then in the old countries across the Atlantic, and two circum-



stances there and then existed, which in fact have something of an effective hang-over there even at the present day.

One was that the worker was fixed in his trade or occupation and fixed in his place of abode. As his fathers before him had worked so he had learned to work, and he could neither think of nor do anything else. His station in life was a fixture, and so also the district where his fathers had lived for generations was the only place he could contemplate for an abode.

The second circumstance was that in fact, the advantage the industrial employer saw in mechanization was limited to his ability to keep down or reduce the payments to his workers. Under these conditions the myth was something more of a fact than a myth. The workers had no increased earnings as a recognition of their increased production, and economically more important still, they could not thus constitute a consuming community to absorb the output with result of providing ultimate employment to absorb the temporary displacement.

In the United States of today these conditions are noticeable by their absence—the workers are remarkably mobile both geographically and in the shift from one industry to another. There is no feeling in the younger generation that they must live where and be occupied as their fathers have.

They are out in fact for change and betterment in these very things, and the broad-sighted policy of the employers in passing on to the workers a substantial recognition of their share in the increased productivity of mechanization, provides the final step in marking the difference between the results of mechanized industry in the United States of the present, and its characteristics at the time of the Industrial Revolution.

#### THE "BENEVOLENT CIRCLE"

Under the circumstances we are living with, the higher wages of the workers and the reduced costs of the products made by labor-saving machinery combine to increase the buying power of the largest group of our population. The standard of living of this group and the whole community tends to rise, and the demand for goods and services of all kinds increases. This inevitably increases production, and with mass methods of manufacture unit costs decrease. This makes lower prices possible, so that the purchasing power of wages rises, and the demand is still further stimulated. In the process, more workers are drawn into production, their wages are increased, and thus we have established the so-called "benevolent circle," which has raised the standard of living of the average family in America

today to a level never before realized anywhere in the world.

Saying it another way, the foundations of our present scale of living is the greater productivity of the individual, made possible through our widespread use of labor-saving machinery.

Averaging all the country over, it is calculated that the hand of the individual American worker moves to its work with the power of about five horses and with a control of touch undiminished in accuracy and nicety—both of these attributes becoming possible through the widespread availability of electric power for all applications, and the wonderful refinement in regulation and control for any desired results.

As an aid in the progress of mechanization there has come about a general adoption of standards, simplification of lines of product, the elimination of much waste, and other improvements in method, all helping in the low cost of product.

One of the objections to mechanization with its adoption of standards has been that the product is of necessity lacking in artistry, and, to speak plainly, unavoidably ugly. That is another machine myth that is in process of being exploded. With the improvements and refinements of machine processes the artist has been called in, and it is appearing on every hand that goods with standard design can be produced on machines at low cost, and at the same time be pleasing to the eyes of persons of good taste.

It is feared by some that there must be an end to the processes of ever-increasing production—that the final result will be a glut of unconsumable goods. In the course of the operations of a complex industrial system such as we live with and by, the production of some commodities is at sometimes overdone, but generally speaking, man's desire for manufactured comforts and luxuries is insatiable, and he will continue to work indefinitely to secure them. If there is a limit, it is not yet in sight.

That labor-saving machinery actually creates a demand for labor is well shown by the case of the automobile. Because automobiles are being produced in this country by a well mechanized industry, their average wholesale value is \$542 apiece, and they are being turned out at the rate of over 4,000,000 a year. According to the National Automobile Chamber of Commerce, 800,000 workers are directly engaged in making automobiles and parts, and 4,000,000 workers are being employed by industries created by the automobile, such as road-building, and the supplying of raw materials, details of equipment, oil, gasoline, and services of various kinds. But if automobiles were hand made it is estimated that the cheapest modern type would be \$10,000.

It is obvious that the demand for such high priced cars would be very small, and that only an insignificant fraction of that army of 4,800,000 people would find work in making and servicing them.

This principle, that the use of labor-saving machinery increases the demand for labor under American conditions, holds good for the nation as a whole. From 1924 to the present year, according to the "Survey of Current Business" for November, 1929, issued by the Department of Commerce, the production of all United States factories increased about 27 percent, but the number of factory employes remained practically unaltered. Thus, though a considerable number of workers must have been released by the introduction of labor-saving machinery during this period, the employment of an equal number has been rendered necessary by the increase in the demand for goods, for instance, in their distribution and servicing. But this takes no account of the increase in those finding employment in the non-manufacturing lines. There are substantial increases in the number of teachers, doctors, dentists, lawyers, insurance men, not to mention those in new services such as moving pictures, radio, aviation, etc.

But some people still insist that there is a serious condition of unemployment in this country due largely to the mechanization of industry, and estimates ranging from 2,000,000 to 8,000,000 unemployed have been published in the last two years. The National Industrial Conference Board has taken the trouble to analyze these figures and finds that all are based on the shrinkages in certain specific industries, including agriculture, and that no account is taken of reemployment in non-manufacturing and new industries. There is, of course, always a certain amount of unemployment, but there is no evidence to show that this is now being increased beyond normal proportions by the introduction of modern labor-saving machinery. Next year the United States Census will begin a study of unemployment, and then uncertainty on this point will cease.

This, however, does not mean that there are not individual cases of temporary hardship due to displacements by machines, and the problem of industrial management is to help minimize in every possible way the transfer period to readjusted employment.

The problem of temporary unemployment is one that is much broader than what is involved in shifts caused by mechanization—seasonal demand is a much more troublesome feature in many industries, also changes in styles, and the

changing of popular preference for the products of one industry as against those of another makes for continuous ups and downs in employment, and of course the periods of more or less severe let down in general business volume have to be reckoned with, and their most distressing aspect is always industrial unemployment.

The earnest study for alleviation of the ills of variable employment in industry is coming more and more to be recognized, with the best minds in industry, as a major problem. In this study the results of mechanization have a place, though by no means a commanding place, and the expectation of improvement on the whole variable employment problem lies in the progress that has been made in the handling of all these things, since industry was established as such, and particularly with the acceleration in recent years of the understanding that the human side of these problems must have a major consideration.

As to the mechanization of mining, the subject in which this group is most directly interested, I suppose we will have to say that the progress made to date is not quite commensurate with what has taken place in the factory-ized industries. At the same time it must be recognized that conditions are different, and relatively more difficult of mechanization than in factory applications.

Nevertheless, much has been accomplished in the coal fields, and probably more particularly in the soft coal oper-

ations, there has been an extensive substitution of electricity for steam and animal power. Automatic substations and automatic pumps, fans, compressors, etc., have been introduced in many mines, while the undercutting machine is what might be termed established practice, 72 percent of the production of soft coal being mined through its aid; and applications of drilling and coal loading machines have been worked out by which two or three men can turn out a product equal to that of many hand workers.

With the progress already made, there remains a field for future applications which is sufficiently attractive to mine operators and owners. Without attempting to go into details, a broad interest view can be obtained from the statement that in an actual development now in the course of equipment, it is figured that the coal per man day will be at least twice that obtainable with ordinary hand methods of operation, and with enhanced safety.

What has been said of the coal industry applies likewise in general terms to metal mining. Mechanization as far as it has progressed has proven its very great advantages. This is seen in the numerous applications of power shovels, electric haulage, and conveyor systems, along with the applications of electricity to the various service duties around the mines. Likewise, as in the coal mining, there are many further extensions of mechanization awaiting the opportunity to prove their justification in lower cost of operation.

For the conclusion I have reserved comment on the part that the American workman has taken in laying the ghost of this machine myth. He has had the intelligence and the judgment to realize that his own welfare improves with every decrease that can be effected in the cost of production. He also has had the courage to act on that judgment in the face of many specious arguments fed out to him for the contrary action. His justification in the correctness of his course he sees about him in the comforts and luxuries of his home and community, greater by far than has come to the lot of any other worker in any other place in present or past times.

This again proves the wisdom of the American policy of spreading education's facilities throughout the entire community, raising the intelligence standard to a point where even those in the manual worker classes are in position to do their own thinking. This, together with the broad policy on the part of industry management in seeing to it that the worker shares adequately in the fruits of low unit costs of production, is the basis of the general high standard of living the country enjoys.

To cooperative understanding of this kind in our industrial field, we owe the exploding of the machine myth—in this day and age and continuance of such cooperative understandings can be counted on to explode likewise any of the other myths that arise to block temporarily the progress of development in this great country of ours.







*"Beauty is its own excuse for being"*

*Boulder Bridge in Rock Creek Park, Washington, D. C.*



# AMERICAN MINING CONGRESS CONVENTION



*Robert E. Tally  
Re-elected President of The  
American Mining Congress*

Annual meeting marked by outstanding addresses on topics of timely interest to mineral industries—Mine stabilization committee authorized—Rosy outlook predicted for various branches — Robert E. Tally re-elected president — Little Rock chosen for 1930 Industrial Development Conference—Hoover's business and flood control policies endorsed—

**M**ANY factors contributed to the success of the 32nd annual convention of The American Mining Congress which was held at the Mayflower Hotel in Washington, D. C., from December 4 to 7. The sessions were limited to a few principal addresses on outstanding questions before the industry, which permitted a more liberal discussion by the delegates on new points developed. The addresses were delivered by men prominent in mining and related industries and commanded wide attention. No important controversial questions were raised and this tended to engender a spirit of cooperation and sustained interest in the topics considered. Interspersed with the business sessions were delightful social occasions which contributed to the increase and cementing of friendships.

Because of his pronounced interest in the stabilization movement, his high standing in the industry and his successful leadership of the organization during the past year, the convention again honored Robert E. Tally, of Clarkdale, Ariz., Vice President and General Manager of the United Verde Copper Company, by re-electing him as President of the organization. Other officers were elected as follows:

**Vice Presidents:** S. Livingston Mather, Vice President, The Cleveland-Cliffs Iron Company, Cleveland; J. F. McDonald, President, Downtown Mines Company, Leadville; Col. T. B. Davis, President, Island Creek Coal Company, New York.



*S. Livingston Mather  
First Vice President of The American  
Mining Congress*

**Secretary:** J. F. Callbreath, Washington, D. C.

**Executive Committee:** Messrs. Tally and Davis and Clinton H. Crane, St. Joseph Lead Company, New York.

**Directors for three years:** Messrs. Crane and Davis; W. J. Jenkins, Consolidated Coal Company, St. Louis; Stanly Easton, Bunker Hill & Sullivan Mining & Concentrating Company, Kellogg, Idaho; and Louis S. Cates, General Manager, Utah Copper Company, Salt Lake City.

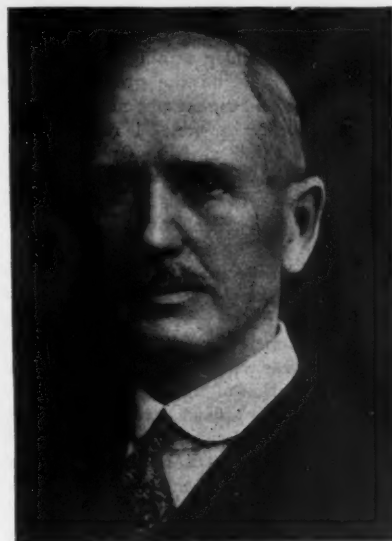
**Director for two years:** C. J. Ramsburg, The Koppers Company, Pittsburgh.  
**Director for one year:** A. E. Bendelari,

President, Eagle-Picher Lead Company, Chicago.

A resolution commending President Hoover for his "signal industrial leadership" was adopted. It reads:

## INDUSTRIAL LEADERSHIP

"That all branches of the mining industry unitedly commend the President of the United States for his signal industrial leadership at this time. By his aggressive action in calling together the leaders in all branches of the industrial and productive life of the whole country, he has brought about a nation-wide cooperation never before attempted in time of peace. In this way he has allayed fear and restored national confidence. The whole country is assured every ave-



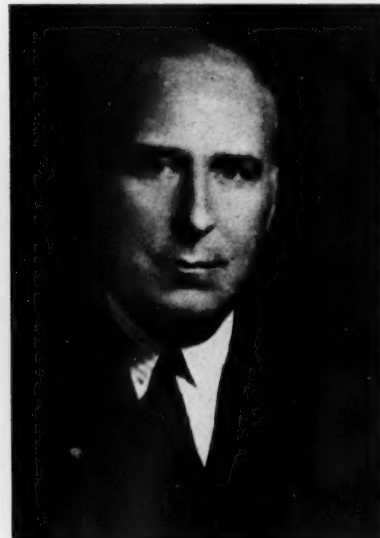
*Jesse F. McDonald  
Second Vice President of The American  
Mining Congress*



W. J. Jenkins



A. E. Bendelari



Stanly A. Easton

#### DIRECTORS CHOSEN AT THE ANNUAL CONVENTION OF THE AMERICAN MINING CONGRESS

nue of trade will be quickened, transportation facilitated and employment extended in all sections of our land. We take great pleasure in expressing our confidence in and pledging our support to the successful carrying out of the national industrial policies, and productive programs presented to the collective industrial leadership of the country by the President."

The convention backed the President in seeking a solution of the public land situation through the recently created Public Land Commission of which J. R. Garfield is chairman, but opposed any policy which shall separate the surface from the sub-surface rights of the lands. Opposition was expressed to proposed legislation forbidding surface rights to lands taken under mining locations in national forests on the ground that it will injure and embarrass necessary development of the mineral resources of the public land states. Opposition to Federal legislation regulating the sale of securities was expressed. Another resolution favored a depletion and depreciation rate of 33 1/3 percent, but preserving to mine taxpayers whose depletion base has been previously established, the right to continue depletion under that method. The action of President Hoover in withholding authority for construction of that part of the Mississippi River flood control project which would destroy the natural gas and other resources in southern Arkansas and northern Louisiana until the matter can be reviewed by engineers and new recommendations made to Congress, was commended by both the convention and the Southern Division of the American Mining Congress. Resolutions were

adopted on the death of Otis Mouser, of Philadelphia, and J. F. Robinson, of Miami, Okla., directors of the American Mining Congress.

A committee was authorized to study the evils of over-production and the hurried exhaustion of natural resources, and to report legislative suggestions to correct the situation. Reference was made to over-production in mining and the difficulty of meeting the situation due to legal restrictions under the anti-trust laws. The committee is to seek a solution of the problem in order that natural resources be conserved and mining placed on a more sound and business-like basis.

#### MINE MECHANIZATION

The work of the American Mining Congress in taking the lead in the mechanization of mines and in cooperating with the Kentucky Progress Commission in promoting the development of the mineral resources of that state was commended by a number of speakers.

The delegates registered the morning of December 4 and the visiting ladies enjoyed a classical musical program at the convention hotel given by Miss Anna Case, metropolitan opera star. At noon the delegates were entertained at luncheon by the American Mining Congress, after which brief remarks were made by representatives from various mining fields. Improved conditions and increased production in the bituminous industry of Illinois were reported by J. D. Zook, of Chicago, president of the Illinois Coal Operators Labor Association.

A. H. Willett, of the National Coal Association, stated that the American Mining Congress has given more in-

formation on the advancement of mechanization than is available from any other source.

Prediction was made by Edward W. Parker, of the Anthracite Bureau of Information of Philadelphia, that within a short time home owners will be able to secure their heat with anthracite as conveniently as they secure their electricity, without smoke, dust, or the danger of explosion or asphyxiation, through automatic processes. He stated that research laboratories of the anthracite industry are testing devices for supplying and controlling automatic heat from the feeding of the furnace to the removal of the ash, with prospects of success.

The varied mineral resources of New Mexico were described by Dr. E. H. Wells, of Socorro, president of the New Mexico School of Mines. He said the increased price of copper had greatly benefited the state. Because no commercially successful process for its treatment had been developed, he stated that the fluorspar deposits were not being utilized. Dr. Wells predicted that New Mexico with its great potash resources would soon supply the requirements of the country for this product. Due to competition of oil and gas, the coal industry of the state has been depressed. The oil and gas industry has a bright outlook due to new discoveries, 8 million barrels of oil per day being produced, and gas being sent to El Paso.

#### ZINC INDUSTRY

The zinc industry has not yet recovered from a drop in the market which occurred in October, but should improve when the further use of zinc will be advertised on a national scale by the industry, according to M. D. Harbaugh, of



Clinton H. Crane



Louis S. Cates



C. J. Ramsburg

#### DIRECTORS CHOSEN AT THE ANNUAL CONVENTION OF THE AMERICAN MINING CONGRESS

Joplin, Mo., secretary of the Tri-State Zinc and Lead Ore Producers Association.

The work of the American Mining Congress in the conservation and development of the mining industry was praised by Judge J. H. Hand, of Yellville, Ark.

"Hats off to the past and coats off to the future," was the slogan sounded by J. F. Callbreath, secretary of the Mining Congress, who stated that "ideas and energy will solve any problem."

Brief remarks were made by R. C. Allen, executive vice president of Oglebay, Norton and Company of Cleveland, representing the iron ore industry; James F. McCarthy, president of the Hecla Mining Company, of Wallace, Idaho; and Eugene McAuliffe, of the Union Pacific Coal Company, of Omaha, representing western mines. A. G. MacKenzie, of Salt Lake City, secretary of the Utah Chapter of the American Mining Congress, presided.

Mr. McCarthy presided at the first business session the afternoon of December 4 which considered "Trends in Industry."

In his annual address, President Tally said the urgent need of the mining industry is stabilization on the basis of fairness to the various interests involved. "The American Mining Congress welcomes the opportunity to cooperate with all industry in developing plans not only for the stabilization of mining, but for business in general."

Speaking on the subject, "The Gold Industry," Bruce Yates, of Lead, S. Dak., general manager of the Homestake Mining Company, said that one result of the stock market situation would be to

divert capital to mining development. He reported improved conditions in gold mining in the Black Hills region, stating that the Trojan Mining Company had reopened after being closed down for several years, and that the mines of the Homestake Company would have a longer life than had been formerly expected. Gold producers had been able to lower their costs without cutting wages, which are still maintained on the war time basis.

#### PUBLIC LANDS

In discussing "The Western Lands Problem," Mr. Callbreath urged support



James F. Callbreath

Secretary of The American Mining Congress

of President Hoover's Public Land Commission which is studying the formulation of a new policy looking to return of lands in the West to the states with proper measures for conservation of their mineral resources. He said each state should be on a parity with all other states, but that such parity is not possible as long as the Government holds the lands.

"The states can not prosper unless they have the power of taxation of their resources, and they can not exercise this power if the public lands belong to the Government," said Mr. Callbreath. "As much land as can be taken up by individuals should be released to the states. The Government apparently has the idea that these lands belong to it as contrasted with the old idea that it is only a trustee holding the land for maturing states. The desire of the Government to withhold these lands from entry is having a hampering effect on the western states. Mr. Hoover's Land Commission is a step forward and is the first helping hand that has been extended to the western states in this respect in years. We should go along with him and work with the commission in reaching a solution of this vexatious public land situation."

In an address on "Mineral Taxation," M. W. Krieh, chief of the Tax Division of the American Mining Congress, declared that the mining and metal manufacturing industries provide "the backbone of the nation's tax structure," and afford "greater possibilities for enlargement of the tax base than any other source." He said that Congress and the State Legislatures should "so frame their taxation and business laws as to





*Hon. John M. Robsion*  
Chairman of House Mines and Mining  
Committee. Mr. Robsion was toastmaster  
at the annual banquet



*Ira E. Robinson*  
Chairman, Federal Radio Commission



*Jesse B. Warriner*  
Vice President and General Manager,  
Lehigh Coal and Navigation Company

permit the freest and largest exploitation and development of mineral resources."

The following were members of the Resolutions Committee: T. O. McGrath, of Arizona; Judge Hand, of Arkansas; G. A. Smith, of California; J. F. Durocher-Stone, of Colorado; F. O. Rush, of Delaware; R. J. Grant, of the District of Columbia; Dr. A. V. Henry, of Georgia; A. P. Ramstedt, of Idaho; Mr. Zook, of Illinois; C. S. Crouse, of Kentucky; Harold Perhan, of Maine; Dr. J. J. Rutledge, of Maryland; Prof. L. C. Graton, of Massachusetts; A. E. Peterman, of Michigan; Emmet Butler, of Minnesota; O. E. McMullen, of Missouri; Eugene McAuliffe, of Nebraska; Powell Stackhouse, of New Mexico; J. D. Conover, of New York; R. C. Allen, of Ohio; A. Scott Thompson, of Oklahoma; E. T. Conner, of Pennsylvania; Mr. Yates, of South Dakota; Mr. Mackenzie, of Utah; Brooks Fleming, Jr., of West Virginia; A. W. Dickinson, of Wyoming. Mr. McMullen was secretary of the committee.

In the evening President Tally tendered a reception to the delegates and ladies in the hotel ballroom, which proved to be a delightful social occasion.

"Mineral Taxation" was the theme of the session the morning of December 5, with Mr. Mather, presiding.

#### MINERAL TAXATION

R. S. Gayton, of the Internal Revenue Bureau, spoke on dividends from depletion or depreciation reserves, outlining methods used by the department in ascertaining the taxable status of corporate distributions to stockholders.

H. B. Fernald, of Loomis, Suffern and

Fernald, of New York, discussed the taxable status of mining dividends and distributions.

A. P. Ramstedt, of Wallace, Idaho, Comptroller of the Hercules Mining Company, expressed opinions on the recent report of the investigating division of the Joint Congressional Committee on Internal Revenue Taxation and favored a mine depletion allowance of 33 1/3 percent of the net income of the property.

Speaking of "Percentage Depletion," L. C. Graton, professor of mining geology of Harvard University, formerly an official of the Internal Revenue Bureau, said: "The principle of depletion is a reality, definitely recognized for hundreds of years, rather than being some special invention or convenience recently brought into existence for the solution of income tax problems. A depletion percentage of 33 1/3 percent of the annual operating profits will be just to the industry, simplify administration of mine taxes, reduce fluctuations in tax burdens on the industry and in Government receipts, and yield as great an average revenue as under the present plan."

Paul Armitage, of Douglas, Armitage and McCann, of New York, spoke on the "Legal Concept of Depletion." He opposed the proposed percentage depletion plan at this time on the ground that the industry is not called upon to take a definite stand in regard to the proposals in a recent report of the investigating division of the Joint Congressional Committee on Internal Revenue Taxation until the committee acts on the matter and submits recommendations to the House Committee on Ways

and Means. He contended that those mining companies which have gone to the expense of establishing a fair depletion base should not be deprived by legislation of their present basis which was fixed on valuation, if they wish to continue it through the life of their operations, as financial and accounting systems are based on this method. For other cases percentage depletion could apply.

"Analytic Valuations in Income Taxation of Mines" was the subject of an address by R. C. Allen, of Oglebay, Norton and Company, of Cleveland. "No one claims that the value of a mine may be determined with precision," he said. "The value of a mine rests solely upon the buyer's estimate or somebody's estimate of the present worth of the income to be expected from that property. Whatever a mine is worth for commercial purposes, it is also worth for the purposes of taxation." He favored a flat rate on net income in place of the present unworkable discovery provision.

At noon a meeting of the members of the American Mining Congress considered miscellaneous matters.

The Board of Governors of the Southern Division, at its annual luncheon meeting, decided to hold the 1930 sessions of its Industrial Development Conference at Little Rock, Ark., next March. Judge Hand presented the invitation on behalf of the Arkansas Real Estate Association, Little Rock Chamber of Commerce, and North Arkansas Mine Owners League. Other invitations were received from Louisville, Lexington, and Ashland, Ky.; Asheville, N. C.; Atlanta, Ga.; Shreveport, La.; Memphis, Tenn.; Houston, Tex.; Mobile, Ala.; Gulfport,





*Dr. L. E. Young*  
Vice President Pittsburgh Coal Company;  
Chairman, National Committee on Mechan-  
ized Mining



*Bruce Yates*  
General Manager, Homestake Gold  
Mining Company



*Daniel T. Pierce*  
Vice President, Anthracite Operators'  
Conference

Miss.; Virginia Beach and Old Point Comfort, Va. Capt. R. M. Watt, of Pineville, who presided, stated that the work of the American Mining Congress in cooperation with the Kentucky Progress Commission, of which he is a member, has been successful and will be continued permanently. He recommended that other states secure its cooperation.

#### SOUTHERN DIVISION

The Southern Division adopted a resolution favoring a flood control policy in southern Arkansas and northern Louisiana which will protect their natural gas resources and conserve their kindred industries, while affording protection against floods. The resolution expressed appreciation for the action of President Hoover in withholding authority for construction of this part of the Mississippi River flood control project for review by engineers and recommendations to Congress. This resolution was presented by Judge Hand who was chairman of a committee of the American Mining Congress which considered last June at Monroe, La., complaints of producers of natural gas and other products in the area affected that their interests would be destroyed by the original Jadwin flood control plan by release of flood waters through the mining fields. The other members of this committee were W. F. Chisholm, member of the Board of Governors for Louisiana, and Dr. Henry Mace Payne, secretary of the Southern Division.

The Southern Division expressed sympathy for Wm. H. Lindsey, its former chairman, who is seriously ill at Nashville.

Matters pertaining to the coal industry engaged the attention of delegates at the afternoon session on December 5, with J. B. Warriner, of Lansford, Pa., vice president and general manager of the Lehigh Coal and Navigation Company, presiding. The first speaker was Dr. Thomas S. Baker, of Pittsburgh, president of the Carnegie Institute of Technology, who in an address on "Research and New Uses for Coal," said the modern science dealing with fuel may draw to the coal fields new industries which were not thought of a generation ago.

"Coal By-Products" was the subject of the next address, by Mr. Ramsburg, which was read for him in his absence by Mr. H. J. Rose.

The pre-eminence of anthracite as a domestic fuel was emphasized by Daniel T. Pierce, of New York, vice president of the Anthracite Operators' Conference. "Household heating, like refrigeration and washing, will ultimately be mechanized," said Mr. Pierce, "and there will be a greater use of the smaller sizes of anthracite. Research is being conducted on ash disposal devices and with heat control systems. There is a great field for improvement in the design and installation of furnaces and boilers." Mr. Pierce said the mine price of anthracite can not be greatly reduced except by securing more production per dollar of labor cost and by tax reduction, which latter now amounts to 35 cents per ton. He stated that it costs too much to transport and distribute anthracite.

A meeting of the members of the American Mining Congress was held in

the evening at which the new directors previously noted were chosen. Later the annual dance which features these gatherings was held.

#### MACHINERY USE

Dr. L. E. Young, of the Pittsburgh Coal Company, presided over the morning session, December 6, devoted to the mechanization of mines as carried on by the American Mining Congress through its National Committee on Mechanized Mining, of which he is chairman. The principal speaker was F. A. Merrick, president of the Westinghouse Electric & Manufacturing Company. In an address on "The Machine Myth," he said: "The use of labor saving machinery increases the demand for labor and tends to raise the standard of living of workers, provided employers share the savings effected by the machines with their employees."

Mr. Zook, vice chairman of the committee, referred to the advance of mechanization in Illinois mines. Mr. McAuliffe favored expansion of the mechanization work of the American Mining Congress. Paul Weir, of the Bell & Zoller Coal & Mining Company, of Zeigler, Ill., said mechanized equipment will work satisfactorily but it is important to train the mine force in its use. F. G. Tryon and W. W. Adams, of the Bureau of Mines, spoke of the interest of the bureau in securing proper statistics on mechanization. C. W. Wright, of the bureau, spoke of giving metal mines the benefit of coal mine mechanization. George S. Rice, of the bureau, referred to the "magnificent work" which is being done by the American Mining Con-

gress along mechanization lines. Lee Long, of Dante, Va., said his company is having no accidents in the use of mechanical equipment. Mr. McAuliffe favored collection of mechanical loading cost and production statistics.

F. S. Pfahler, of Gillespie, Ill., vice president and general manager of the Superior Coal Company, said there had been no accidents at the mechanized mines of his company. Plans for continued activities of the committee were discussed, including contact with mining institutes and local meetings of mining operators, by Glenn B. Southward, mechanization engineer of the American Mining Congress.

A meeting of the Sectional Committee of the American Standards Association on Fire Fighting Equipment in Metal Mines, sponsored by the American Mining Congress and the National Fire Protection Association, considered a preliminary draft of recommendations for action by interested bodies. It covers requirements for equipment to be used in fighting metal mine fires, fire fighting personnel and fire prevention methods.

At its annual luncheon meeting, the board of directors selected officers for the new year as previously given.

Ladies accompanying the delegates were guests at a delightful musicale and tea given at the hotel by Mrs. Callbreath in honor of Mrs. Tally.

Dr. Payne presided at the final session the afternoon of December 6 when the resolutions as previously reported were adopted.

#### GOVERNMENT COMMISSIONS

In an address on "Commissions as an Aid to Industry and Government," Ira E. Robinson, Federal Radio Commissioner, and former War Mineral Relief Commissioner, spoke of the work of Government commissions.

"Commissions can aid industry only as they assist good government," said Mr. Robinson. "To be of aid to government and industry, commissions must be conducted so that they do not lose sight of the ideals of due process of law, orderly procedure, and fair play. Commissions must avoid even the appearance of arbitrary action. In those matters which come under the control of the Federal Government, the tremendous development of railroads, and perhaps later of the interstate distribution of power, has brought the situation to a national problem. Such enterprises must submit to government regulation in the public interest."

Copper consumption by public utilities and electric manufacturers was outlined by Paul S. Clapp, of New York, managing director, National Electric Light Association, in an address on "Electricity—The Servant of Industry."

Speaking on "The Release of Pros-

perity Reserves," Otto T. Mallery, member of the industrial relations committee of the Philadelphia Chamber of Commerce, and former member of the 1921 conference on unemployment and the committee headed by Mr. Hoover on overcoming seasonal construction in the building industry, said American business should not wait for the count of nine before struggling to its feet.

The annual informal dinner was held the evening of December 6, and was devoid of set speeches. Instead the delegates were given entertainment by the National Broadcasting Company, featuring the South Sea Islanders in song and instrumental music and the Pemberton Dancers, followed by dancing. Several hundred persons were present, including Senators Oddie (Rep., Nev.), Chairman of the Senate Mines and Mining Committee; and Ashurst (Dem., Ariz.); and Representatives Colton (Rep., Utah), Chairman of the House Public Lands Committee, and Eaton (Rep., Colo.). Representative Robsion (Rep., Ky.), Chairman of the House Mines and Mining Committee, was toastmaster.

The delegates made a tour of observation of the process of producing paper money and stamps at the Bureau of Engraving and Printing on the morning of December 7, as the guest of Director A. W. Hall.

#### PROGRESS IN MINERAL INDUSTRIES REVIEWED

A big advance in avoiding over-production was made by the oil industry during 1929, Dr. Thomas Thornton Read, Professor of Mining in Columbia University, declares in a review of progress in minerals. Improved pool operation to eliminate waste, and better technology, he asserts, promise constructive results in 1930.

"Over-production, with its attendant price-cutting, unprofitable and interrupted operation, expense for the maintenance of idle plants, and the disorganization of operating forces, is in process of being brought under better control," Prof. Read says.

"The oil industry, which has the greatest natural disadvantages, in this respect, to contend with, has made the most remarkable progress in the past year.

"The President's action in announcing that it would hereafter be the policy of the Government to hold back its mineral lands from development so long as there existed over-production from privately owned areas has done much to help the situation, though his action has met with some opposition.

"Progress in the oil industry during the year has not been confined to these lines alone, since there has been much advance in technology. Engineers are now talking confidently of drilling wells

10,000 ft. deep, and they have already passed 8,000 ft.

"Coal is our principal mineral industry and, like oil, it suffers from over-production. This year has been characterized by low prices, the closing of smaller mines, and the consolidation of small units into larger ones. In Kentucky, for example, last year production was one-third larger than four years previously, while the number of mines in operation was one-fifth less.

"One of the notable features of the year is the spread of the trade practice movement among the coal producers, the National Coal Association taking the lead in promoting it, and marked benefit is already perceptible.

"Another notable feature in the coal industry is the extensive way producers have gone into service and research work to help the customer get the best results from his fuel. The anthracite producers have long enjoyed the advantage of the preference of the consumer for their product because it is smokeless and dustless, but the activity of oil-furnace salesmen seriously threatened that advantage.

"This led to the formation of Anthracite Coal Service, which employs over 75 service engineers with branch offices in 32 cities, extending as far West as Milwaukee, covering the smaller communities with a motor-car service. A credit bureau and a traffic bureau have served to advance the interests of the anthracite producers.

"In the bituminous, which is by far the largest field, the most interesting developments are in the low-temperature coking of raw coal, yielding a smokeless fuel, gas and a long list of important by-products. The coke has to compete with anthracite, with which it is at a disadvantage because it is more friable and bulky; the producers have countered by marketing a coke that has much less ash than anthracite.

"This year has seen a further increase in the growing application of research to problems concerning the non-metallic minerals, which have such a large and growing diversity of use.

"Here, too, we find consolidations of small units, intense study of the technical problems involved, and the application of improved equipment to the production and utilization of the minerals.

"One of the interesting features of the mineral industry is the way in which equipment devised for use in the mineral industry often finds a much wider use. Grinding, agitating, and filtering equipment originally designed for mineral milling plants has come to have an immensely wider field throughout industry. Thus the mineral industry contributed not only raw materials but technique and devices that are continually improving the well-being of all human kind."

# LEGISLATIVE REVIEW

General legislation considered by Congress at its regular session—Tax reduction program, covering one percent cut in corporation and individual taxes for 1929, provided—Senate continues consideration of tariff revision bill but action thereon not expected until early in 1930

MEETING in its regular session on December 2, Congress began consideration of general legislative proposals. The program for Congress was mapped out by President Hoover in an annual message which presented to the legislators his recommendations on national issues. The House completed the organization of all of its committees and the Senate was in the process of reorganizing its committees preliminary to active consideration of a host of legislative proposals. No time was lost in either House during the first three weeks of the session, which recessed for the holidays from December 21 to January 6. The most important action from a business standpoint was taken by both the Senate and House when they passed a joint resolution providing for a 1 percent reduction in the corporation and individual income tax effective on 1929 returns to be made on March 15 next. The House also passed the first of the bills making appropriations for the Government departments for the new Government year beginning July 1 next by approving allotments for the Interior Department. The long pending controversy over the seat of Senator-elect W. S. Vare, of Pennsylvania, was disposed of by the Senate when it denied the seat to Mr. Vare and also to his contestant, former Secretary of Labor William B. Wilson. Governor Fisher, of Pennsylvania, thereupon appointed Joseph R. Grundy, of Bristol, an active figure in the manufacturing industry and a leading advocate of the protective tariff to represent Pennsylvania in the Senate until the November election next year. The Senate then resumed consideration of the tariff provision bill but prediction is being made by some Senators that it can not be passed before next March. Action on

the Muscle Shoals, Ala., nitrate and power project is to be taken by the Senate after disposition of the tariff bill.

A number of mining bills have been presented including measures to grant a three-year extension for oil and gas prospecting permits; regulating the quality marking of silver articles; establishing an assay office at Dahlonega, Ga.; creating an industrial relations commission; decreasing railroad rates; equalizing rail and ocean rates on export and import traffic; granting preference in the immigration quotas to skilled workers; providing funds for the public land commission; for operation of the Muscle Shoals project; to license corporations under the Federal Trade Commission; and establishing uniform requirements for Government contracts.

Representative Robison, of Kentucky, continues as Chairman of the House Committee on Mines and Mining, the other members of which are as follows: Colton, Utah; Sproul, Kansas; Manlove, Missouri; Arentz, Nevada; Englebright, California; Keifner, Missouri; Shott, West Virginia; Turpin, Pennsylvania; Ramey, Illinois; and Sutherland, Alaska, Republicans; Greenwood, Indiana; Underwood, Ohio; Whitehead, Virginia; Somers, New York; Hare, South Carolina; and Smith, West Virginia, Democrats.

Chairmen of other important committees of the House are as follows: MacFadden, Pennsylvania, Banking and Currency; Perkins, New Jersey, Coinage; Johnson, Washington, Immigration; Leavitt, Montana, Indian Affairs; Parker, New York, Interstate Commerce; Kopp, Iowa, Labor; James, Michigan, Military Affairs; Britten, Illinois, Naval Affairs; Vestal, Indiana, Patents; Colton, Public Lands; Demp-



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sey, New York, Rivers and Harbors; Curry, California, Territories.

The following is a summary of pending legislation:

## PROSPECTING PERMITS

H. R. 6573. Mr. Douglas (Dem., Ariz.). This bill proposes a three-year extension of oil and gas prospecting permits. Public Lands.

H. R. 5690. Mr. Martin (Rep., Mass.). This bill proposes to regulate the quality marking of articles of merchandise made of silver or its alloys. Interstate Commerce.

H. R. 6998. Mr. Bell (Dem., Ga.). This bill proposes to establish an assay office at Dahlonega, Ga. Coinage.

S. 2221. Mr. Walsh (Dem., Mass.); H. R. 5689. Mr. McCormack (Dem., Mass.); H. R. 6846. Mrs. Rogers (Rep., Mass.). These bills propose to coin 500,000 silver 50 cent pieces in commemoration of the 300th anniversary of the founding of the Massachusetts Bay Colony. Banking and Currency and Coinage.

H. J. Res. 133. This resolution provides for a 1 percent reduction in individual and corporation income taxes on



### IMPORTANT BILLS REVIEWED IN THIS ISSUE

#### Mining

H. R. 6572—Douglas (D. Ariz.). Oil and Gas Prospecting Permit Extension.  
H. R. 5690—Martin (R. Mass.). Quality Marking of Silver.  
H. R. 6958—Bell (D., Ga.). Assay Office in Georgia.

#### Taxation

H. J. Res. 133—One Percent Corporation and Individual Income Tax Reduction. Law.

#### Industry

H. J. Res. 157—Browning (D., Tenn.). Industrial Relations Commission.

#### Transportation

H. R. 5665—Vinson (D., Ga.). Rate Reduction.  
S. J. Res. 104—Howell (R., Nebr.). Prevent Rate Increase.  
H. J. Res. 154—Luce (R., Mass.). Equalize Rail and Ocean Rates.  
H. R. 6610—McLeod (R., Mich.). Canadian Shipments.

#### Public Lands

H. R. 6153—Colton (R., Utah). Public Land Commission.  
S. 2250—McNary (R., Oreg.). Proof of Occupancy.  
H. R. 7254—Englebright (R., Calif.). Land Grant Surveys.  
S. 2366—McNary (R., Oreg.). National Forest Receipts.

#### Power Development

H. R. 5625—Langley (R., Ky.). Muscle Shoals Operation.  
H. J. Res. 142—Almon (D., Ala.). Muscle Shoals Operation.  
H. R. 5407—Johnston (R., Mo.). State Water Power.

#### Trade Practice

H. R. 5284—Tinkham (R., Mass.). Federal Trade Commission Licenses.  
H. R. 6584—Hare (D., S. C.). Plant Closing Notice.  
S. 2356—Jones (R., Wash.). Foreign Trade Zones.  
H. R. 6609—McLeod (R., Mich.). Commercial Aviation Loans.  
H. R. 6995—Johnson (R., S. Dak.). War Control of Property.  
H. J. Res. 151—Patman (D., Texas). Payment for Conscripted Property.  
H. R. 5568—Cramton (R., Mich.). Uniform Government Contracts.

1929 income tax returns to be made on March 15, 1930. Enacted into law.

H. J. Res. 157. Mr. Brown (Dem., Tenn.). This bill proposes to establish an industrial relations commission of three Senators, three Representatives, and three persons appointed by the President, representing organized labor, employers, and farm organizations. The commission would hold hearings anywhere in the country and would report to Congress as to relations existing between employers and employees in the principal industries of the country. The investigation would cover methods used in industries where strikes or lockouts occur and those methods in industries where peaceful relations are maintained. The commission would seek to discover the laws of industrial discord and those of industrial peace in industrial concerns. An appropriation of \$25,000 is provided for its expenses. Rules.

H. R. 5665. Mr. Vinson (Dem., Ga.). This bill proposes to reestablish railroad rates which were in effect on February 28, 1920, before the present transportation act went into effect. Interstate Commerce.

S. J. Res. 104. Mr. Howell (Rep., Nebr.). This resolution provides that for the purpose of rate making the Interstate Commerce Commission shall use the methods of valuation adopted by it in the O'Fallon rate case. Interstate Commerce.

H. P. Res. 154. Mr. Luce (Rep., Mass.). This resolution authorizes the Interstate Commerce Commission and the Shipping Board to investigate the practicability of equalizing rail and ocean rates on export and import freight traffic. Interstate Commerce.

H. R. 6610. Mr. McLeod (Rep., Mich.). This bill proposes cooperation between the Interstate Commerce Commission and the Board of Railway Commissioners of Canada in cases affecting shipments between the United States and Canada. Interstate Commerce.

H. R. 7259. Mr. Fitzgerald (Rep., Ohio.). This bill directs the War Department to ascertain if the Miami and Maumee Rivers are available for use as a canal from Toledo to Cincinnati. Rivers and Harbors.

H. R. 6329. Mr. Kelly (Rep., Pa.); H. R. 6330. Mr. Kendall (Rep., Pa.); H. R. 6345. Mr. Wyant (Rep., Pa.). These bills appropriate \$1,500,000 for two locks and dams in the Youghiogheny, River between McKeesport and West Newton, Pa. Rivers and Harbors.

H. R. 6978. Mr. Gasque (Dem., S. C.). This bill provides for the admission of certain aliens, including traveling business men, chemists, and civil engineers for not more than one year. Immigration.

H. R. 7258. Mr. Free (Rep., Calif.). This bill grants preference in the quota limits to aliens trained in a particular art, craft, business, or science. Immigration.

#### PUBLIC LANDS

H. R. 6153. Mr. Colton (Rep., Utah). This bill authorizes the President to appoint a commission of 25 members to study and report on the conservation and administration of the public domain, and appropriates \$50,000 for its expenses. Public Lands.

S. 2250. Mr. McNary (Rep., Oreg.). This bill relates to the proof of occu-

pancy and possession of public lands, and provides as follows:

"That no possession or occupancy of any public lands in the United States which appear by the records of the Interior Department to be vacant and not reserved or withdrawn from entry, unless such possession or occupancy be authorized by some Act of Congress, shall be sufficient ground for denying to a qualified entryman the right to enter the same under an appropriate public land law. Nothing herein contained shall prevent the Secretary of the Interior from permitting in proper cases the correction or validation of imperfect titles to public cases the correction or validation if imperfect titles to public lands by those claiming and occupying the same in good faith by virtue of some Act of Congress under which there may have been defective proceedings for obtaining title from the United States or a State." Public Lands.

H. R. 7254. Mr. Fitzgerald (Rep., Calif.). This bill provides for payment to railroads of funds deposited by or for survey of lands within land grants which were found to be exempted from such grant. Public Lands.

H. R. 5283. Mr. Williamson (Rep., S. Dak.). This bill provides that the purchase of allotted Indian lands approved by the Interior Department prior to June 25, 1910, shall cover entire title to the land. Indian Affairs.

S. 2306. Mr. McNary (Rep., Oreg.). This bill proposes to increase from 25 percent to 50 percent the receipts from national forests to be paid to the States, beginning July 1, 1923. Agriculture.

S. 2318. Mr. Jones (Rep., Wash.). This bill proposes to establish the Grand Coulee National Park in Washington, without effecting mineral claims to the land. Public Lands.

S. 2327. Mr. Steiwer (Rep., Oreg.). This bill conveys lands to Douglas County, Oregon, for park purposes, but reserves the mineral rights to the Government with the right of prospecting and mining. Public Lands.

H. R. 5292. Mr. Curry (Rep., Calif.). This bill authorizes the city of Napa, Calif., to purchase public lands to protect its water supply, but reserves the minerals to the Government and the right of prospecting and mining. Public Lands.

H. R. 6981. Mr. Nolan (Rep., Minn.); S. 2498. Mr. Shipstead. (F. L., Minn.). These bills propose to withdraw from entry all public lands north of Township 60 in Cook, Lake, and St. Louis Counties, Minnesota, for the purpose of conserving the natural beauty of the shore lines for recreational use. Public Lands.

H. R. 6574. Mr. Douglas (Dem., Ariz.); S. 2231. Mr. Hayden (Dem., Ariz.). These bills propose to reserve public lands in



Arizona for the Papago Indians, but continuing them subject to the mining laws. Indian Affairs.

H. R. 5672. Mr. Douglas (Dem., Ariz.); S. 2173. Mr. Hayden (Dem., Ariz.). These bills propose to abolish the Papago Saguaro National Monument in Arizona and to reserve the mineral deposits of the land to the Government with the right of mining and prospecting. Public Lands.

H. R. 6874. Mr. Douglas (Dem., Ariz.); S. 2411. Mr. Hayden (Dem., Ariz.). These bills authorize exchanges of lands with owners of private lands in the Petrified Forest National Monument in Arizona, with reservation of the minerals in the public lands exchanged to the Government, and the right to extract the minerals. Public Lands.

#### MUSCLE SHOALS

H. R. 5628. Mrs. Langley (Rep., Ky.) This bill provides for operation of the Muscle Shoals, Alabama, nitrate and power project by the Farmers' Federated Fertilizer Corporation. Military Affairs.

H. J. Res. 142. Mr. Almon (Dem., Ala.). This resolution provides for a Government corporation to operate the Muscle Shoals project. Military Affairs.

H. J. Res. 49. Amendments to by Mr. Black (Dem., Ala.). These amendments provide for completion of Dam No. 3 in the Tennessee River near Muscle Shoals and for Government operation of the project in case it can not be leased by the War Department.

S. 2458. Mr. Sheppard (Dem., Tex.). This bill provides for inspection by the Department of Commerce of vessels propelled by internal combustion engines. Commerce.

S. J. Res. 94. Mr. Dill (Dem., Wash.). This bill authorizes the naval airplane carrier *Lexington* to furnish electric power for the people and industries of Tacoma, Wash., because of a shortage of power from the municipal plant. Naval Affairs.

H. R. 5407. Mr. Johnston (Rep., Mo.). This bill would forbid jurisdiction of the Federal Power Commission over waters of any kind which are entirely within the boundaries of a single State. Interstate Commerce.

#### TRADE PRACTICES

H. R. 5284. Mr. Tinkham (Rep., Mass.). This bill would authorize the Federal Trade Commission to license corporations to transact interstate commerce where the Commission found that it did not constitute an unlawful monopoly, unreasonable restraint of trade, unfair competition, or detriment to the public. If after the license was issued the Commission should find that these principles are not maintained, it would conduct a hearing and report its findings to the Department of Justice. Interstate Commerce.

H. R. 6584. Mr. Hare (Dem., S. C.). This bill will require manufacturers in interstate commerce to give written notice to the Federal Trade Commission of intention of closing their plants. Interstate Commerce.

S. 2356. Mr. Jones (Rep., Wash.); H. R. 6592. Mr. Welch (Rep., Calif.). These bills propose to establish foreign trade zones in American ports. Commerce and Ways and Means.

H. R. 6609. Mr. McLeod (Rep., Mich.). This bill proposes an appropriation of \$100,000,000 for Government aid to individuals and corporations engaging in commercial aviation, the loans to bear 3 percent interest. Interstate Commerce.

H. R. 6995. Mr. Johnson (Rep., S. Dak.). This bill provides that in case of war the President shall take control of the material resources and industrial organizations of the country and stabilize the prices of services and commodities. Military Affairs.

H. J. Res. 151. Mr. Patman (Dem., Tex.). This resolution proposes a constitutional amendment providing for the payment of just compensation for private property which may be taken for public use in time of war. Judiciary.

H. R. 5568. Mr. Cramton (Rep., Mich.). This bill proposes to establish uniform Government contract requirements. Judiciary.

S. 2354. Mr. George (Dem., Ga.). This bill proposes to include naval stores in the agricultural marketing act. Agriculture.

H. R. 5718. Mr. Tinkham (Rep., Mass.). This bill provides for the registration before Congress of persons employed to advocate or oppose legislative measures. Judiciary.

H. Res. 69. Mr. Schafer (Rep., Wis.). This resolution provides for an investigation by the Committee on Expenditures in the executive department of persons appearing before Congress on legislation, and calling on the Treasury Department for income tax data on companies whose representatives appeared in behalf of the tariff legislation, similar to that passed by the Senate. Rules.

H. Res. 91. Mr. Fort (Rep., N. J.). This resolution creates a new committee in the House to consider complaints which may be made as to untrue statements delivered by members in debate in the House. The purpose is to remove the immunity which members enjoy of answering in any other place for statements they may make in Congress. Rules.

H. R. 6175. Mr. Crail (Rep., Calif.). This bill proposes to pay \$268,500 to the Mack Copper Company for use of its property in San Diego County, California, as an army camp from May, 1917, to June, 1922. War Claims.

#### INTERSTATE COMMERCE COMMISSION NON-FERROUS METAL RATE INVESTIGATION

When the Interstate Commerce Commission resumes its investigation into freight rates on nonferrous metals at Washington, D. C., on January 27, shippers will present their case and cross examine representatives of railroads who presented data at the first hearing in Chicago on December 11. The railroad data covered voluminous statements showing the movement of the metals and their rate history. J. H. Parmelee, of the Bureau of Railway Economics, submitted on analysis of the general economic conditions concerning the mining, smelting, refining and manufacture of non-ferrous metals and alloys in the United States. Based on the distributed values of the content of the ore, the ore values in 1928 per ton of ore and tailings as mined for the more important nonferrous metal producing states were given by him as follows: Arizona, \$5.01; Montana, \$12.74; Utah, \$4.30; Michigan, \$3.49; Missouri, \$3.71; Oklahoma, \$3.37; and New Jersey, \$18.78.

Mr. Parmelee said there has been a fairly regular and sustained growth in the smelting and refining industry and in the manufacture of nonferrous metals and alloys in this country during the past 30 years. He stated that the prices of the metals from 1922 to 1928 compare favorably with pre-war prices and are higher at present than at any time since 1909, except during the period from 1914 to 1920. At present, he said, the metal prices are relatively higher than for any commodity group, except farm products and hides and leather products. He further stated that companies engaged in mining, smelting, refining and manufacturing nonferrous metals and alloys as a group paid substantial dividends in 1926, 1927, and 1928. Statement was made by Mr. Parmelee that the better grades of copper ores are being depleted or there has been a change in the method of extracting copper and that the lower grades can be utilized to better advantage than formerly. Arizona is ranked as the most important copper producer, Missouri the most important lead producer and Oklahoma the most important zinc producer.

More than three score metal mining and allied companies are represented before the Interstate Commerce Commission in its investigation of the freight rate structure on nonferrous metals. The case is being jointly considered by the commission and the State Railroad Commissions.

The time and place of further hearings, including those requested for western points, will be decided by the commission following the hearing here on January 27.

FIGURE 1

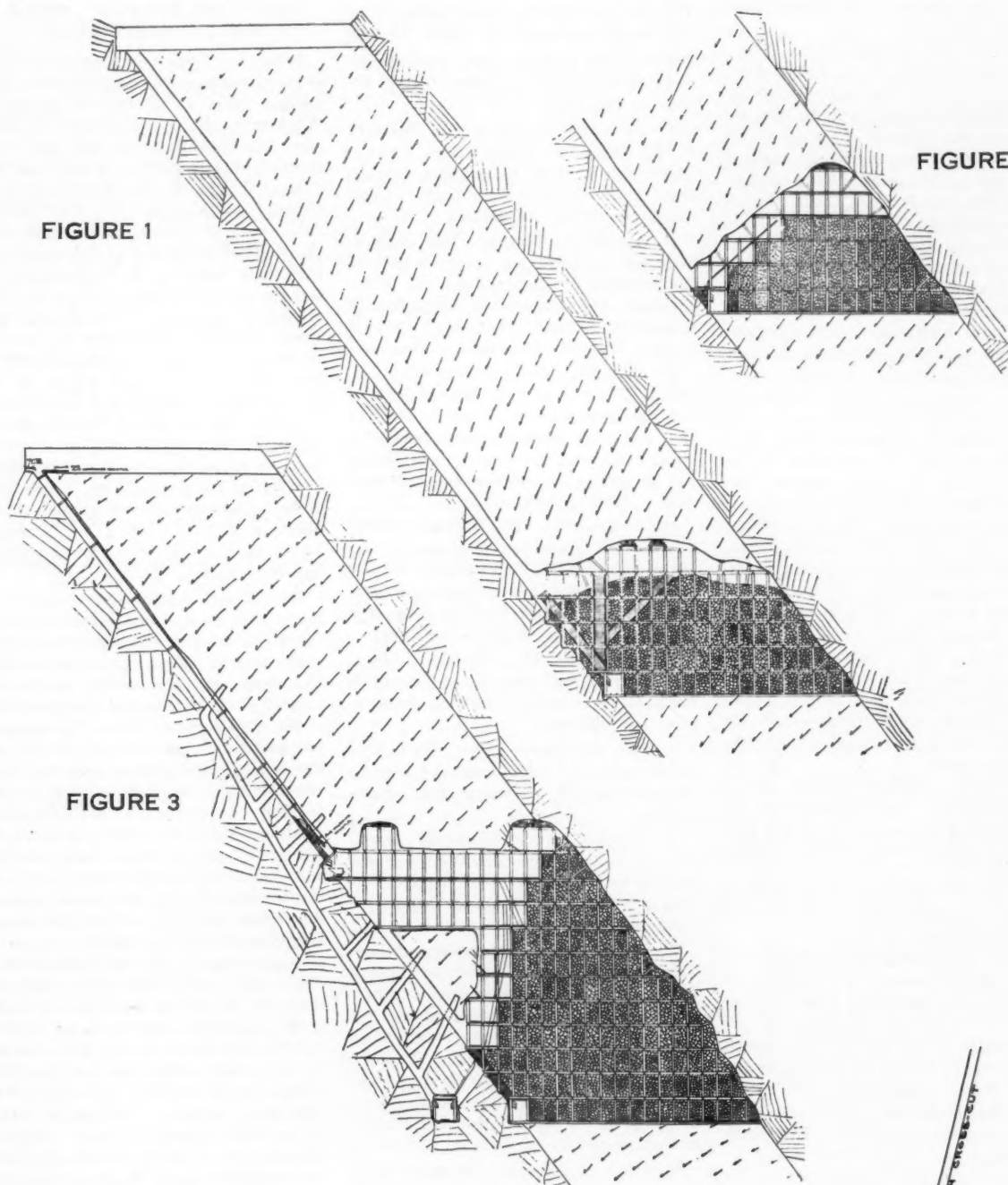


FIGURE 2

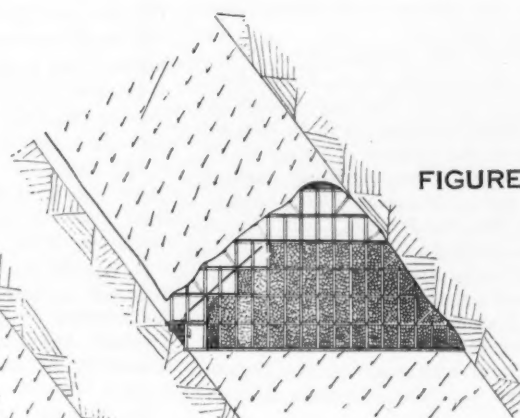


FIGURE 3

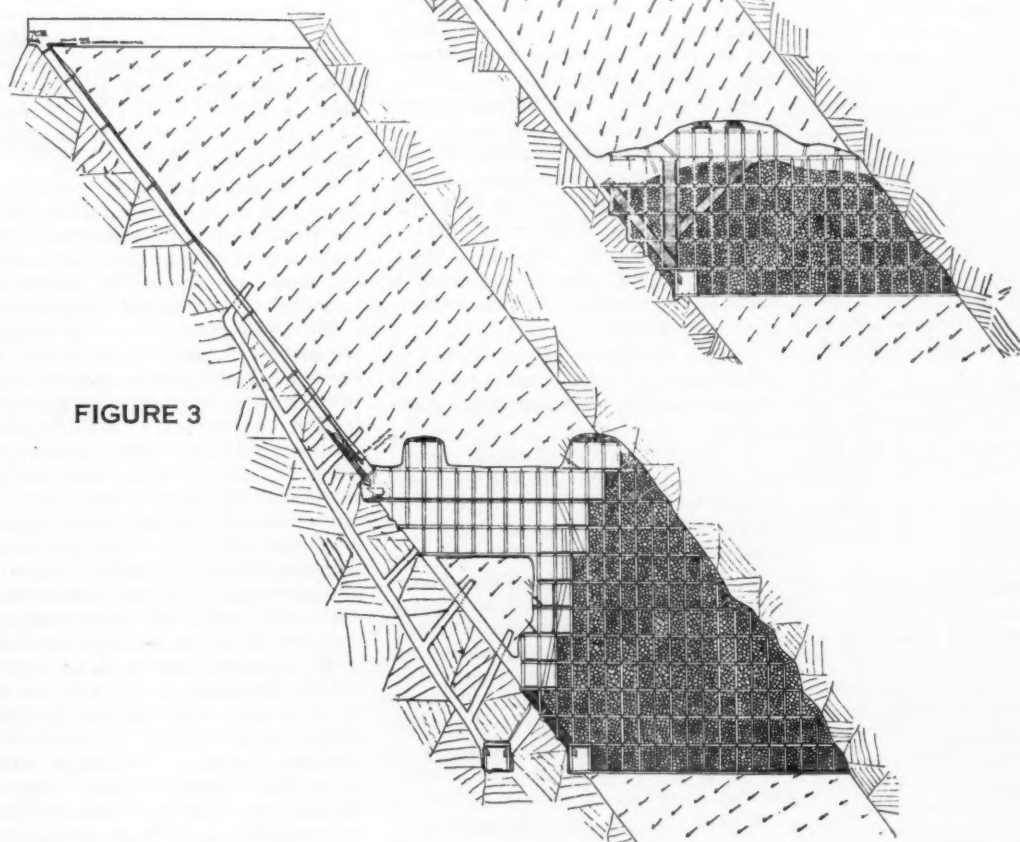
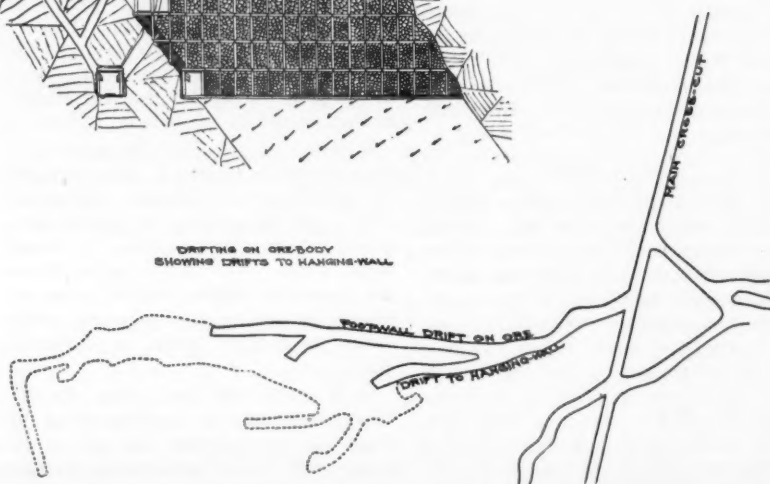


FIGURE 4



## PRACTICAL OPERATING MEN'S DEPARTMENT

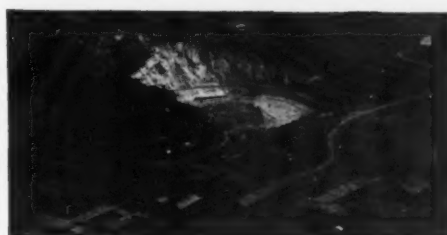


# METALS

GUY N. BJORGE

Editor

Practical Operating Problems  
of the Metal Mining Industry



## MINING PRACTICE at Bunker Hill & Sullivan

By U. E. BROWN \*

**Method of mining designed to secure complete recovery of ore—Safety a major factor—Complete description of method employed and results obtained**

**T**HE lead-silver ore of the Bunker Hill and Sullivan and affiliated mines at Kellogg occurs in large, irregular bodies of almost every shape. The methods evolved for mining these bodies have had two objects in view, viz, the complete recovery of the ore and safety of workmen.

The ore in the Bunker Hill mine is of good grade and any method that did not make a complete recovery could not be successful.

Some of the ore bodies could possibly be worked by shrinkage methods, others by some form of top slicing at probably lower costs than the methods now practiced, but the ore bodies are so irregular in shape that a satisfactory recovery would be difficult.

### LEVELS ARE CUT AT VERTICAL INTERVALS OF 200 FT.

The veins may be divided into two types: The Jersey Fissure type and the Bunker Hill type. The ore bodies of the Jersey Fissure system vary in width from a few inches up to 40 ft., with a dip from 45 to 50 degrees. These veins traverse rather hard quartzite which gives good walls. This allows most of the ore bodies to be mined by stull and

fill methods with crib chutes and manways. The ore is always blasted on plank floors, covered with fine waste to prevent loss of fine ore. The ore is shoveled into wheelbarrows and coarse waste, if present, is thrown out by a sorter. The coarse waste is used to build up walls, behind which the finer material is thrown. These walls also restrict the scattering of ore during blasting. Sorting not only enriches the mill feed but furnishes a part of the necessary filling for the stope.

When the ore has been removed to an inconvenient height above the floor, the chutes and manways are raised by additional rounds of cribbing and the plank flooring taken up. The stope is then filled to about 4 ft. below the back. This is done either by blasting down rock from the hanging wall or by running waste into the stope through a raise to the level above.

Chutes are spaced 15 to 20 ft. apart, are built of 8-in. half round cribbing flat side in, and lined with plank or sometimes steel plate where abrasion is severe. The manways are spaced 50 ft. and are built of 8-in. cribbing round side in.

When stoping is begun a raise is driven from about the middle of the stope, following the footwall to the level above. This raise serves the stope as a pass for tools, timber and waste, and for ventilation. When the stope is half-way

to the level above the raise is used as a passage for the miners.

Ordinarily very little timber is needed but when necessary the hanging is supported by stulls and headboards, and sometimes by stulls and wall-plates. If the stope becomes very wide or when a section of soft ground is encountered, square sets are used.

When the back of the stope is 24 ft. below the level above, square sets tightly filled replace the stulls. In this way the drift will keep open with little trouble.

The ore of the Bunker Hill type is found in large, irregular masses of galena with siderite and quartz gangue. The practice is to remove all material showing any galena; extremely low-grade ore is therefore sometimes mined but, by so doing, high-grade ore is often uncovered. Ordinarily one well-defined wall is found; sometimes there is no wall and never two. The dip of the ore ranges from 40 to 50 degrees. No two cross-sections of the ore body even when close together are alike. The ore bodies in general range from 300 to 1,000 ft. in length and from 30 to 125 ft. in width.

While a definite hanging wall is seldom found, the rock over the ore will be termed the hanging wall. This is invariably heavy, and close filling with waste is the only method by which it can be safely supported. As rapidly as the ore is removed square sets are erected and as soon as convenient these sets are

\* Chief Engineer, Bunker Hill & Sullivan Mining & Concentrating Company.

Presented to Western Division meeting of The American Mining Congress, Spokane, Wash., October 2, 1929.

FIGURE 5

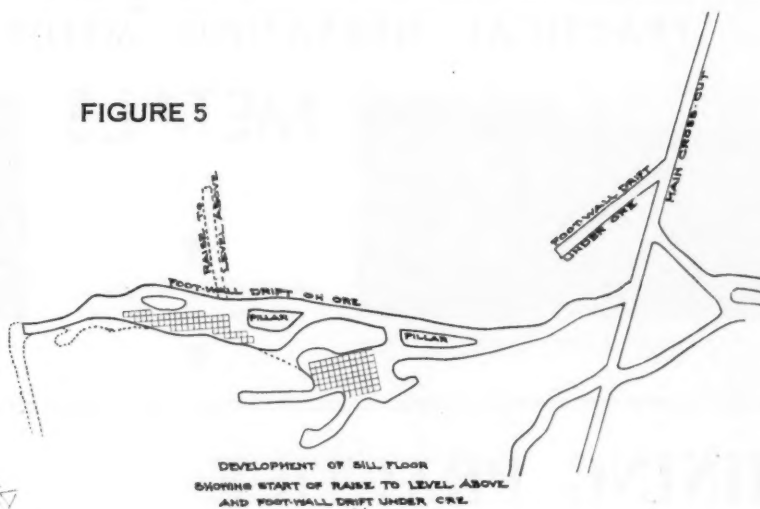


FIGURE 6

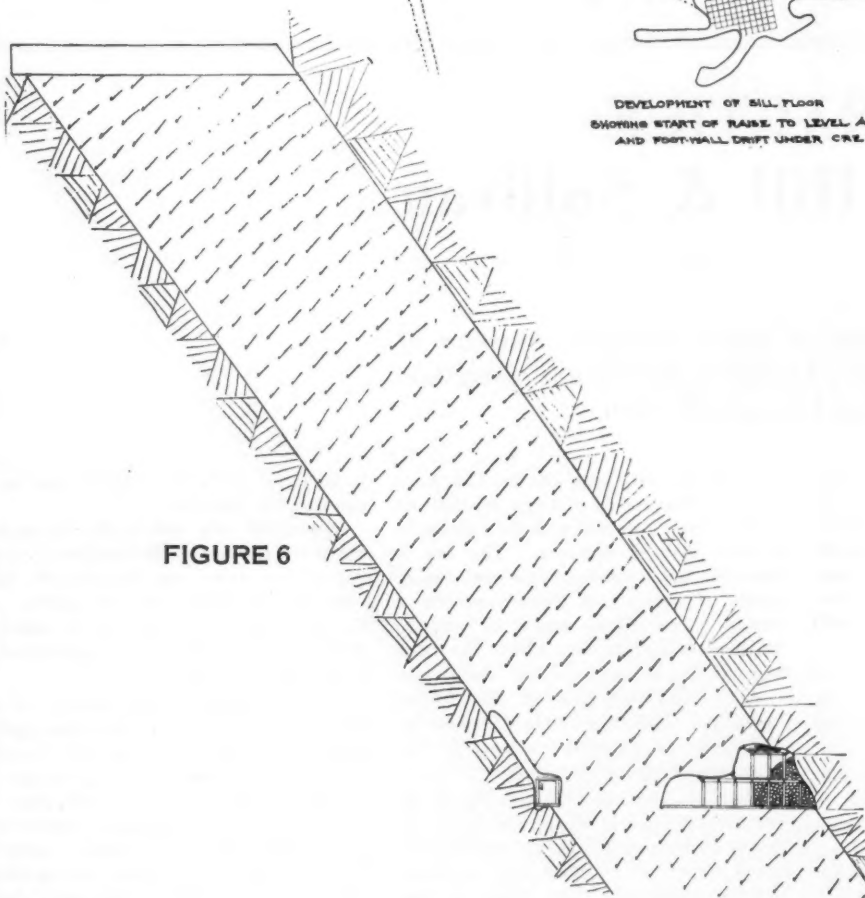
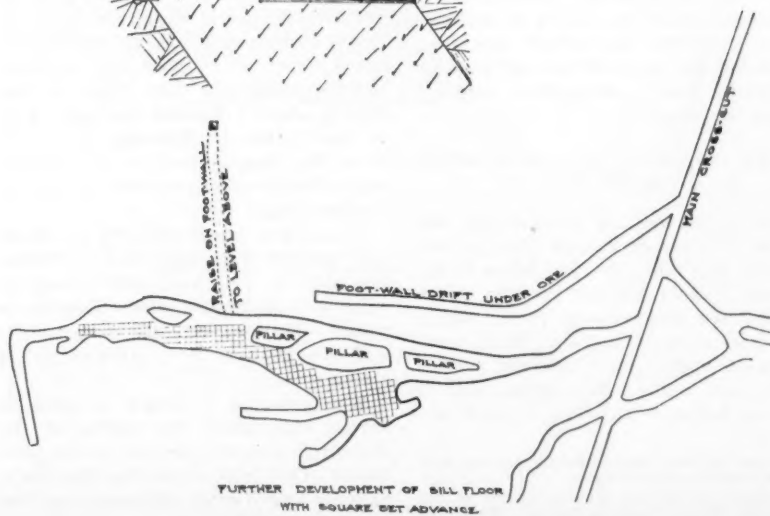


FIGURE 7





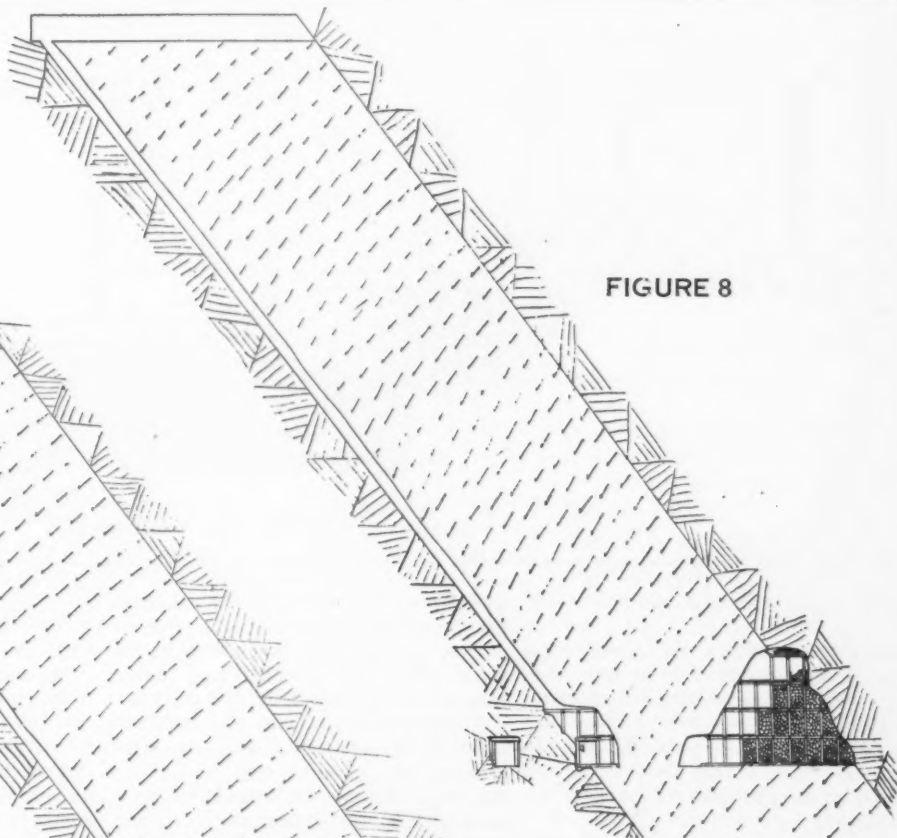


FIGURE 8

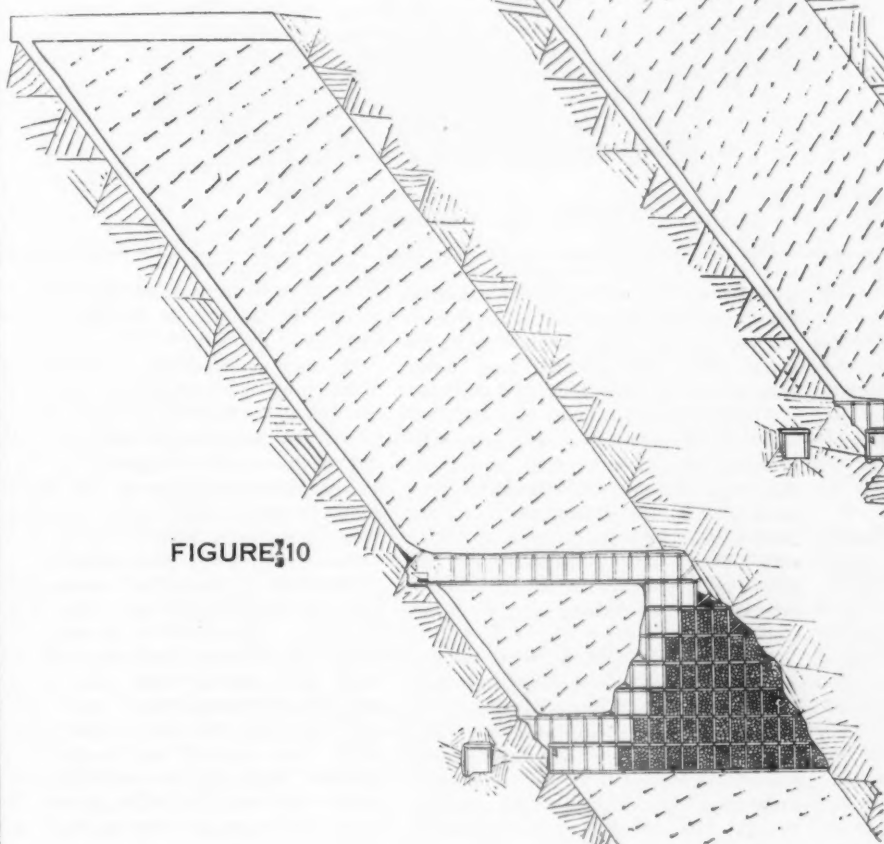


FIGURE 10

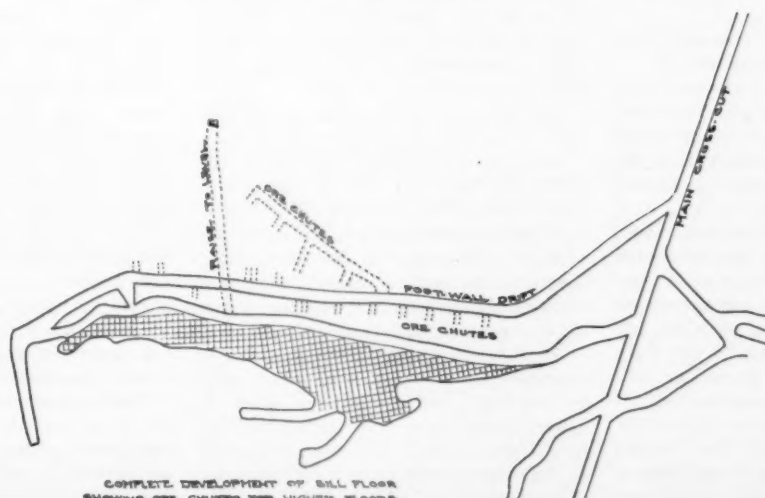


FIGURE 9

COMPLETE DEVELOPMENT OF SHAFT FLOOR  
SHOWING ORE CHUTES FOR HIGHER FLOORS

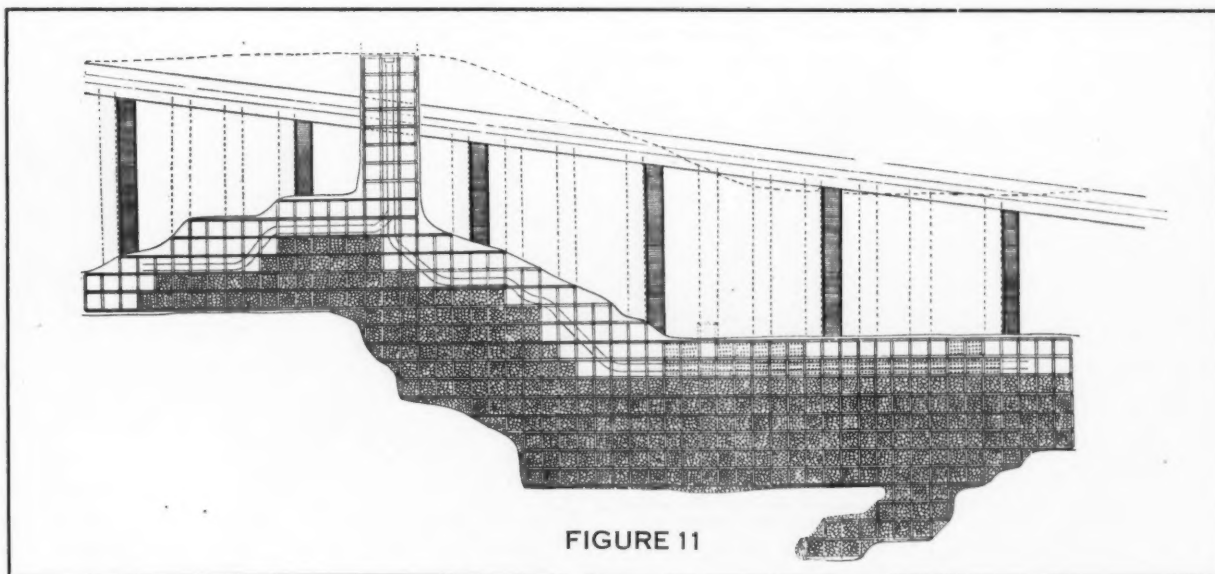


FIGURE 11

tightly lagged with slabs and filled with waste.

Square set timbers are light 12-in. round posts and 8-in. x 10-in. caps and ties. These timbers serve to prevent sloughing of the ore from the face, to protect the miners and as a container of the waste. Neither they nor any heavier timbers alone could support the mass of the hanging wall.

Waste is obtained from two principal sources: development work and waste raises. It is distributed through a pass connecting with all the levels.

The method of stoping is an evolution from the flat back stope shown in *Figure 1* through the low flat arch shown in *Figure 2* to the high sharp arch of *Figure 3*.

To illustrate the sequence and methods of opening and working a stope, the Day stope on the No. 14 level is taken as an example. The procedure in this stope is typical of the operation of all the large timbered stopes in the mine.

The vein is cut by the cross-cut from the shaft and a drift driven on the foot wall to the extremities of the ore body. When the ore widens so that it can not all be included in the foot-wall drift, cross-cuts are driven at intervals to the limit of the ore on the hanging-wall side (*Figure 4*).

Stoping is started on the hanging-wall side of the vein. This is shown in plan and section by *Figures 5 and 6*. A floor of plank lagging is laid and square-set timbers placed. These are extended and the back row filled to support the wall. A new floor is started above the sill-floor, the first row of square-sets extending into the hanging-wall to obtain filling for the sill-floor, and then toward the foot-wall, maintaining at all times a well-arched back. Stopping progresses from the hanging-wall toward the foot-

wall. From the foot-wall drift, at about the center of the ore shoot, a raise is started on the foot-wall to the level above. When this raise has been "holed through," it is timbered with 6-ft. posts and 10-ft. caps to provide a waste pass and a timber pass with a ladder manway between. Air lines and water lines enter the stope through this manway. Another drift is started from the cross-cut, to keep about 20 or 30 ft. under the foot-wall. This is extended at the same time that stoping is being started, and finally becomes the main haulage way from the stope.

The next stage is shown by *Figures 7 and 8*. The foot-wall raise is completed. The rock drift is being extended. The pillars of ore are being attacked. The various places where stoping has been started are joined. The alignment of the square-sets on meeting may not be straight, but a small change of direction is at times advantageous as thrust is carried to the walls. The first foot-wall drift is generally completed by this time and the boundaries of the ore body have been determined.

The complete development of the sill-floor is shown by *Figures 9 and 10*. Chutes are started from the drift in the foot-wall toward the ore, at intervals of 15 to 20 ft. The hanging-wall portion of the stope is advanced by mining nearly vertical slices, one or two sets wide; additional floors are opened to keep a strong arch over the stoped area, and a nearly vertical face is maintained.

At this stage the foot-wall raise is connected by a line of square-sets with the top floor; track is laid and waste is drawn from raise and distributed by hand-trammed cars. The stope is worked so that the highest part is at the raise, sloping down to each end of the ore body. This allows the waste and tim-

bers, brought in through the raise, to descend by gravity to the place where they are to be used.

The final abandonment of the sill-floor is shown by referring to *Figure 3*. From the drift in the foot-wall a raise is driven at a little steeper angle than the foot-wall of the ore, and branched at intervals to intersect the ore at the highest floors; it thus serves as an ore chute when these floors advance to the foot-wall, and eliminate the necessity for transference of ore on an intermediate level. If the stope is very long, additional foot-wall raises at intervals of 200 ft. are driven to the level above and the stope developed at each point in the manner already described. Such raises generally start on one of the higher floors, from a row of sets driven to the foot-wall. *Figure 3* also shows the temporary slides used to get the ore into the chutes and the waste into the sets being filled.

*Figure 11* shows the plan of a floor and illustrates the method of distributing waste. In case of heavy or soft ground the square sets at the face are lagged with slabs and filled, leaving an open set over the chute as shown by the dotted area. From the open set at the chute, one set is cut toward the foot-wall and a section as many sets long as convenient is mined either up or down. In bad ground, filled and open spaces alternate and at no time is a stope left unsupported by filling. *Figure 11* also shows the rock chutes 15 to 20 ft. apart reaching to the foot-wall of the stope and the cribbed manways 50 ft. apart.

Referring again to *Figure 3*. This figure illustrates the advantages of a vertical working face. Drilling of the ore by uppers is much easier and quicker than by flat holes. The ore falls nearly vertically into (*Continued on page 41*)

# MILLING PRACTICE at the Morning Mill

By M. P. DALTON \* and G. S. PRICE †

**T**HE Morning ore is what is usually described as a "complex ore." It is an intimate mixture of lead and zinc sulphides with gangue of siderite and quartzite. The mixture of the sulphides is such that grinding to 100-mesh is necessary for their separation.

Like all the other mills of the Coeur d'Alene district, the equipment originally consisted of Harz jigs, tables and vanners. The crushing was Blake and gyratory crushers, rolls, and Huntington mills.

With that equipment it was impossible to recover more than about 50 percent of the lead and silver, and no attempt was made to save any of the zinc. The lead concentrates produced were of low grade, about 45 to 47 percent Pb.

With the introduction of flotation the situation began to improve. The first flotation equipment was added to the mill in 1911, for the purpose of recovering some of the zinc, and consisted of 250 McQuisten tubes. This resulted in the production of 15 tons per day of zinc concentrates assaying 45 percent Zn. Subsequently various other types of flotation machines were added, from time to time, and the recovery of zinc was increased. The lead concentration continued on the gravity basis until 1923. In that year the changing of the mill to an all flotation basis was begun. This change was very slow, as it was made without shutting the mill down; and it was not until 1926 that it was completed.

The equipment of the mill, which has a capacity of 1,100 tons of ore per day, is now as follows:

- 2 Blake crushers, 9 in. x 15 in.
- 1 Symons cone crusher, 4 ft. diameter.
- 7 Hardinge mills, 8 ft. x 36 in.
- 10 O & D flotation machines, for lead.
- 8 M. S. machines, for zinc.
- 8 Callow machines, for cleaning zinc.
- 3 Portland filters.

In detail the treatment of the ore may be described as follows:

## CRUSHING PLANT

The ore is hauled from the mine in 4½-ton bottom dump cars drawn by electric locomotives through a tunnel 10,000

ft. long and, after being weighed, is dumped into the 1,200-ton mine ore bin. The ore is drawn from the bin and passes through a 9-in. x 15-in. Blake jaw crusher with a 4-in. discharge opening. This allows a hammer head to pass through without damage to the crusher. The crusher discharges onto an 18-in. conveyer that delivers the ore into a two-section punched plate trommel screen with 1½-in. and 2-in. round holes. The undersize is conveyed to the mill bins. The oversize goes to a slow-moving belt conveyor where wood, trash and pieces of iron are picked out by hand, and the ore is then carried by conveyor to a 4-ft. Symons cone crusher with a 1-in. discharge opening. The crusher discharge joins the undersize from the trommel screen just ahead of the picking belt and passes through an automatic cup sampler which cuts out about 5 percent of the total as a mill feed sample. The remainder goes to a shuttle conveyor that distributes to the 1,125-ton mill bin. Screen analysis of the cone crusher feed and discharge follows:

CONE CRUSHER FEED	
+4"	9.1% by weight
-4"+3"	21.8%
-3"+2"	34.9%
-2"+1"	31.8%
-1"	2.4%
	100.0%

CONE CRUSHER DISCHARGE	
-2"+1½"	3.5% by weight
-1½"+1"	16.0%
-1"+12mm.	45.1%
-12mm.+7mm.	26.8%
-7mm.	8.6%
	100.0%

## SAMPLING PLANT

The sample cups dump into a shaking feeder which discharges to a 14-in. x 30-in. roll with ½-in. opening. The roll discharge passes over the two 4-ft. diameter plate and scraper type samplers, the first cutting 1/50 and the second 1/72 of the feed to it. The final sample, weighing about 30 pounds, is sent to the assay office, this entire amount being dried and crushed before cutting down.

The analysis of the average mill feed is as follows:

acting as a bowl classifier. The discharge of the bowl plus the classifier sands makes up the Hardinge feed. The overflow of the bowl goes to the classifiers of the primary and secondary mills and is used as dilution water.

The combined overflows of the classifiers containing about 30 percent solids goes direct to lead flotation and has the following screen analysis:

-48+65 mesh	0.2%
-65+100 "	2.3%
-100+150 "	6.0%
-150+200 "	10.1%
-200 "	81.4%
	100.0%

## ASSAYS

H <sub>2</sub> O	Ag. Oz.	Ph. %	Zn. %	FE. %	Ins. %	Mn. %	S %	CaO %
2.	3.7	9.2	6.7	15.9	39.3	1.9	4.7	1.2

\* Mill Superintendent, and † Assistant Mill Superintendent, Federal Mining & Smelting Company, Mullan, Idaho.

Presented to meeting of Western Division of The American Mining Congress, Spokane, Wash., October 2, 1929.



## LEAD FLOTATION SECTION

This section consists of eight 6-compartment O & D roughing machines, two 6-compartment O & D cleaning machines, one 16-ft. air type cleaner and auxiliary pumps and elevators. The rougher machines are in parallel, the froth from the first three compartments of each going to the cleaners and the froth from the last three compartments going to the middling regrind section. The rougher concentrate is cleaned three times on O & D and air type machines. The tails from the first cleaner go to the middling regrind section and the tails from the second and third cleaners return to the first and second machines, respectively. The final lead tail goes to the zinc flotation section.

The amounts of reagents per ton of ore treated in the lead section follows:

Zinc Sulphate .....	.26 lbs.
Aerofloat, 25% .....	.11 lbs.
Cresylic Acid .....	.03 lbs.

## ZINC FLOTATION SECTION

This section consists of eight 8-cell Minerals Separation 24-in. Sub "A" flotation machines and eight old type Callow cells as cleaners. The M. S. machines are divided into two sections of four machines each. The feed enters the M. S. machines in the second cell, the froth from the first four cells being rougher concentrates. The froth from the next four cells together with that from the 8 cells on the next machine in series, returns to the first cell.

The rougher concentrates are cleaned twice on Callow cells, the tails from the first cleaner returning to the original zinc feed, and from the second cleaner returning to the first.

The amounts of reagents per ton of ore treated in the zinc section follows:

Copper Sulphate .....	.47 lbs.
Sodium Xanthate .....	.25 lbs.
Barrett No. 4 Oil .....	.22 lbs.

## FILTERING SECTION

The filtering of the products is done by three 14-ft. x 14-ft. Portland filters, two for lead and one for zinc. Each filter is connected to a 30-ft. Dorr thickener by an elevator. These elevators are arranged with a by-pass back to the thickeners to main the proper pulp density. The density of the feed to the lead press is 80 percent solids, and that to the zinc press 75 percent solids.

Screen analysis and moisture content of the filter cake is as follows:

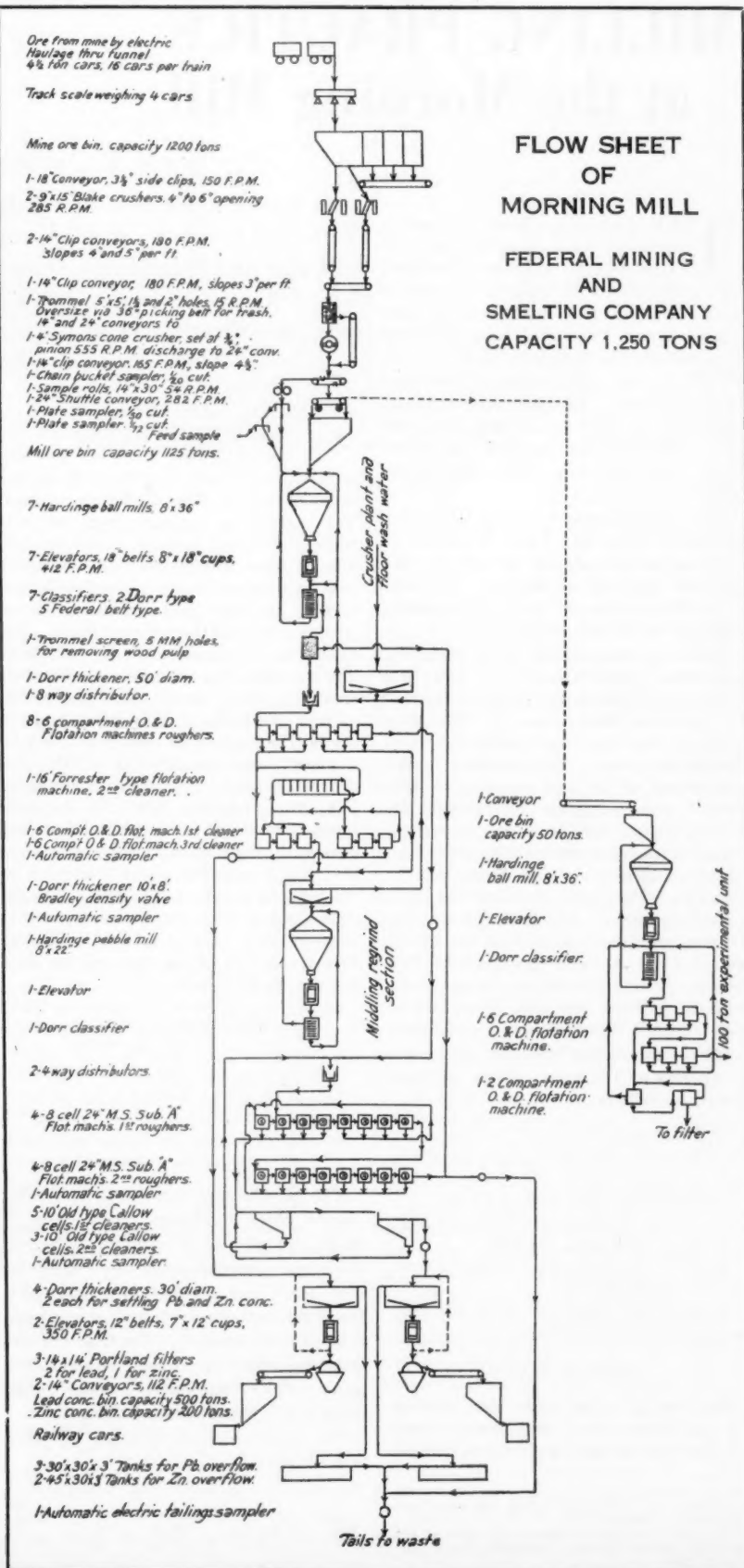
LEAD CONCENTRATES	
Moisture .....	7.6%
+100 mesh .....	0.0%
+150 mesh .....	0.0%
+200 mesh .....	1.5%
-200 mesh .....	98.5%
	100.0%

ZINC CONCENTRATES	
Moisture .....	9.0%
+100 mesh .....	1.9%
+150 mesh .....	10.4%
+200 mesh .....	12.7%
-200 mesh .....	74.0%
	100.0%

(Continued on page 41)

FLOW SHEET  
OF  
MORNING MILL

FEDERAL MINING  
AND  
SMELTING COMPANY  
CAPACITY 1,250 TONS





# INTEGRATING SYSTEM of Car Loading

By DOUGLAS C. CORNER \*

Proper directing more important than equipment although selection and coordination of equipment held vital—Time studies of Moffat, Cascades and Ojuela Tunnels—Car switching loading records and a proposed multiple car loading system

**M**INING and tunneling have become so much a matter of coordination of equipment, personnel, and methods that the credit for an accomplished piece of work can not be attributed to any one type of equipment, but must instead go to the directing genius of the organization doing the job. This situation is very gratifying to the engineering profession, for it means that the engineer has found a place for detailed planning on work which in the past required merely a sufficient supply of man power.

A number of impressive records have been made in the past few years. Three of these records are shown herein, and it is our purpose to indicate the amount of time, thought, and effort expended by the men in charge of these undertakings in carrying them to their successful conclusions.

There is, of course, no question about the recent methods having increased the speed of driving, but there remains something to be said in the matter of costs. It is a question as to whether the present-day costs are due to different methods or simply changed economic conditions. In other words, would not earlier methods with the present-day wage scale show a higher tonnage or yardage cost than do the present high-speed systems? The fact that practically every recent tunnel job has used mechanical loading, even where time of completion did not play an essential part, would indicate that modern methods are in line as regards cost.

An interesting cost development is the increased application of labor-saving equipment in other parts of the world, in countries where man power is not at a premium. This trend can not be accounted for entirely by the desire to follow American methods; it, therefore, appears that the new systems are saving both time and money.

In connection with the mechanization of this type of work, there is ample opportunity for engineers to exert their best judgment in selecting the type of equipment best suited to the job in hand. A manufacturer may believe that his

equipment is a cure-all for all evils, but there is sufficient competition in all lines to satisfy the most exacting purchaser. Naturally, it is poor economy to use machinery that is too small or not powerful enough, just as it is rank extravagance to use equipment that is larger or more powerful than necessary.

The secret seems to be to purchase the equipment which, when assembled for operation, works in smoothest harmony with the other component parts. A broad view of the job as a whole should be held by the engineer in charge be-

fore any purchases are made. It is our belief that correct coordination of the items—namely, drills, shovels, cars, locomotives, etc.—that go to make up the plant is of supreme importance.

Below are listed three of the most important recent tunnel jobs, three records that will be difficult to beat.

From the time studies it is apparent that car switching occasioned considerable delay. Obviously, the loaders were not much more than 50 percent effective; that is, they were loading only approximately half of the time, while

COMPARISON OF THREE RECENT TUNNEL JOBS USING DRILL CARRIAGES AND SHOVELS (MECHANICAL)

Tunnel	1924-1925—Moffat	1926—Cascade	1927—Ojuela
Size heading	8 x 9	8 x 9	8 x 9
Length	32,250	41,150	5,412
Rock	Hard blocky granite	Altered granite	Shale and limestone
Object	Center heading railroad tunnel	Center heading railroad tunnel	Mine drainage
Crew	Three shifts per day, 1 boss, 7 drilling and 7 mucking	16 men	Three shifts per day, 17 men per shift
Drill carriage and drills	Denver 17 and I-R, No. 72, 4 drills	Denver No. 17 Four drills	I-R No. 72 Four drills
Mucking equipment	Electric shovel	Electric shovel	Air shovel
Trackage	One main line, 24-in. gauge with overhead air switch	Three main lines, 4 rails on 24-in. gauge	One main line, 24-in. gauge with special track switches for car transfer
Haulage	4-ton trolley gathering reel loco.	6-ton trolley and gathering reel loco.	2½-ton storage battery loco.
Cars	50 - cu. - ft. steel side dump	50 - cu. - ft. Steel side dump	40-cut.-ft. rocker dump
Average drill round	25 9-ft. holes	28 holes, aver. depth 8 ft. 6 in.	24 holes cuts 10 ft., others 8
Average round mucked	19 cars 48 tons	28 cars 7½ ft. of 9 x 10	20 cars 40 tons
Average time mucking	2 to 2½ hrs.	1½ to 2½ hrs.	1½ to 2½ hrs.
Average time of cycle	4 hours 56 min.	4 hrs., 40 min.	5 hrs. 37 min.
Maximum daily foot	65		43
Maximum monthly	30 days: 777, one heading; 1,551, two headings	1157, 31 days	1,901

TIME STUDIES, AVERAGE CYCLES, AVERAGE SHOVELING TIME

Job	Moffat	Cascade	Ojuela
Ventilation	21 min., 15%	27 minutes	12 minutes
Loading completed	1 hr. 56 min., 85%	2 hrs. 10 min.	2 hrs. 30 min.
Total	2 hr. 17 min., 100%	2 hrs. 37 min.	2 hrs. 42 min.
Yardage	7½ ft. of 8 x 9 wide, 19 cars (50 cu. ft.)	7½ ft. of 9 x 10 wide, 28 cars (50 cu. ft.)	7 ft. of 8 x 9 wide, 20 cars (40 cu. ft.)
AVERAGE DRILLING TIME			
Taking in drill carriage and setting up	23 min., 15%	28 min.	30 min.
Drilling	1 hr. 38 min., 61%	1 hr. 17 min.	1 hr. 50 min.
Tearing down, blowing holes, loading, blasting	38 min., 24%	18 min.	35 min.
Total	2 hrs. 39 min., 100%	2 hrs. 3 min.	2 hrs. 55 min.
Footage drilled	234 ft. using 1¼-in. hollow drill steel	238 ft.	208 ft. using 1¼-in. hollow drill steel
Explosives	5 boxes, 60% gel.	4 boxes, 60% gel.	1½ boxes, 40% dynamite
Contractors	Hitchcock & Tinkler, Inc.	A. Guthrie & Co.	Company force

\* Mining engineer, St. Louis, Mo.

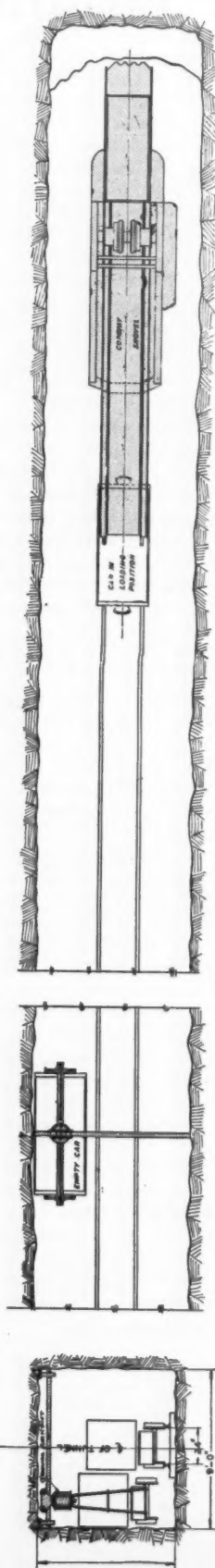


Figure 1 is the Moffat System of switching cars. After a shot, a jackbar is placed at a wide point in the heading about 250 to 300 ft. back from the face, depending upon how far back the fly dirt extends. On this bar, runs a trolley supporting an O'Rourke air hoist with which an empty is lifted off the track from out of the trip and set over to the side, whereupon the gathering locomotive pushes an empty up to the point where the shovel is loaded. It gets its load and backs up to the point where the empty is suspended. This empty is then placed on the track ahead of the train to run up to

the shovel and another empty is hoisted and set over out of line. The operation is repeated until the entire train is loaded. The locomotive then goes out with its loads and brings in another trip of empties. The operation is quicker than using a portable siding, but more costly because of the constant locomotive attendance. The added speed more than offsets the cost. With drilling and mucking crews alternating between the two parallel headings and working three shifts a day for 30 days a total of 1,551 ft. was advanced.

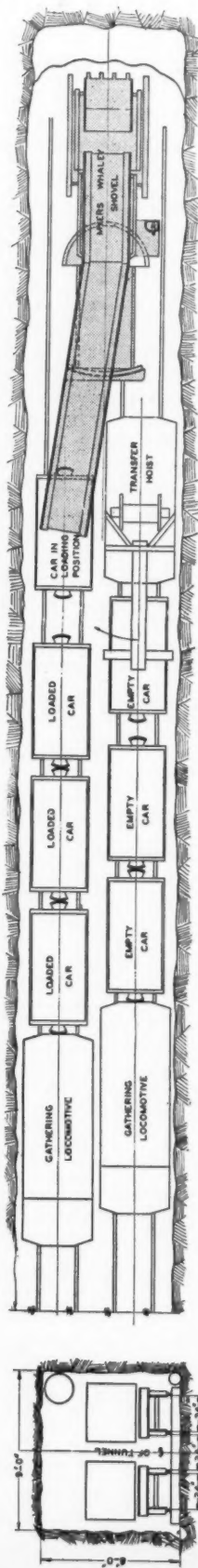


Figure 2 shows the Cascade Four Rail System, a separate empty and load-track, with the "devil strip" in between laid on gauge for use by both the shovel and drill carriage. To reduce the delay in switching, two locomotives are used in connection with a track mounted, air operated transfer hoist which follows immediately

behind the loading machine but on the empty-track. An empty is picked up and transferred to the load-track as soon as the loaded car has been hauled back enough for clearance. It was with this system that the world's record of 1,157 ft. of 8 by 9 tunnel was driven in a 31-day month.

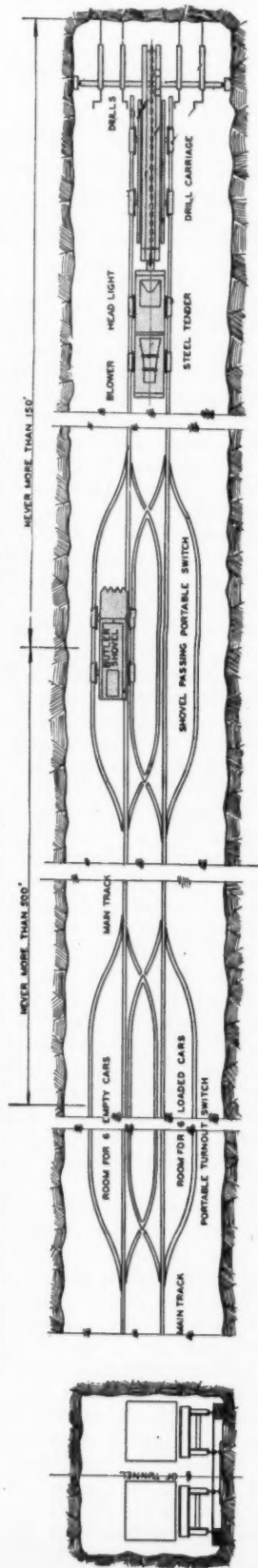


Figure 3 shows the Hezlewood Movable track layouts as used on the Ojuela Adit. The plan calls for two portable turnout tracks that are superimposed upon the main line and provided with tapered rail points. It was found desirable to keep the first or passing switches within 150 ft. of the face, whereas the second or

portable turnout was longer with room for air cars, and was located less than 500 ft. from the first passing turnout. Cars were switched by hand between the turnouts and to the shovel. A rack drill tender with headlight and air operated blower helped the working conditions at the face while drilling.

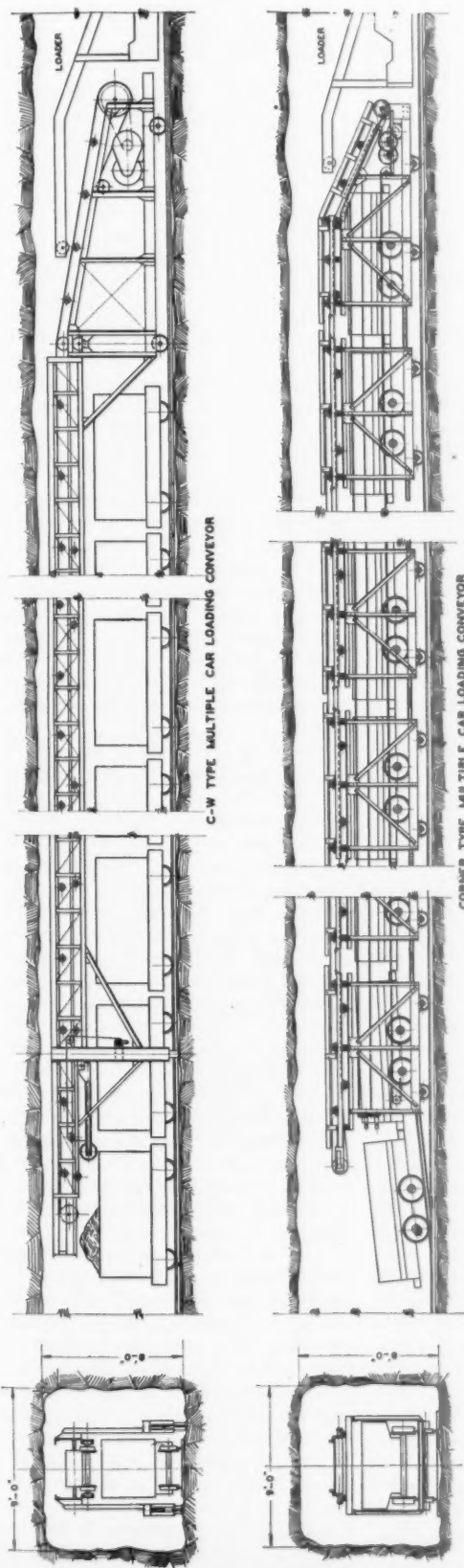


Figure 4. From the above sketch, it will be seen that the cars are run back under the conveyor, nested, and that the last car is loaded first. It is here that Mr. Garcia's "Integrating System" goes into action. Instead of waiting until the trip is loaded, the first load is removed and an empty switched back in its place. While the switching goes on, the conveyor loads the No. 2 car. After the returned empty has received its load, there are two loads to remove, and two empties are returned, while in the meantime No. 3 car is getting its load. By this ingenious system it is possible to take 15 loads from a four-car-length conveyor, before it is necessary to shut down and wait for empties. Thirty-one loads may be taken from a five-car-length conveyor, and for those interested in the higher possibilities the following formula will apply:

$$X = 2n - 1$$

$x$  = the number of loaded cars that may be removed from a conveyor before it is necessary to shut down

$n$  = the length of the conveyor expressed in number of cars. For example, how many cars may be removed from a conveyor six cars long?

$$x = 2n - 1 = 64 - 1$$

$$= 63 \text{ cars}$$

The above system is recommended for those officials who have been troubled by daily reports of delays caused by waiting for cars. Naturally, the "Integrating System" requires additional locomotive service, but the added cost will be more than made up by the increased progress

the other half was spent waiting for cars. To be more explicit, on one of these jobs 28 percent of the loading cycle was used for actual shoveling, whereas 24 percent of the time was spent switching cars. We doubt if this same relationship would hold for the other two jobs because of their more extensive switching facilities, but certainly some condition of a similar nature existed.

The various switching systems are illustrated here, and it is in connection with these ingenious schemes that so much careful thought and effort was expended. It was here that the engineer contributed heavily towards the excellent results obtained.

Car service delays offer a most opportune field for improvement. It is along this line, then, that we must develop next; in short, some sort of multiple car-loading device holds promise of relief. A device of this sort is shown herewith. The conveyor shown is for straight-away work only, but much attention is being given to this matter, and in the near future it will be possible to obtain a device of this kind for work on curves. Already the advocates of multiple car loading have divided into two classes, those who propose to load a trip at a time and pile up a load on the conveyor while awaiting the empty trip, and those who prefer the integrating system suggested by John A. Garcia, of Allen & Garcia Company, Chicago.

The same problem applies to tonnage loading in other types of mining. For instance, in rooms and open stopes car-service delays have defeated the best efforts of many machine-loading applications. There is no doubt that short portable conveyors, operating between the face and the entry and also between the face and through a crosscut to the track in the next room, offer relief from car-service delays. In this case the conveyor line would be at a right angle to the track, whereas the sketches cover an "end on" condition of loading.

A conveyor job of unquestionable magnitude is to be seen in Seattle, where electric shovels are digging away an entire hill in the center of the city. Each shovel dumps on an auxiliary conveyor, which in turn dumps onto the main conveyor and the material is conveyed across the city and deposited on barges. The possibilities of similar practice in mines and tunnels are attractive; some one will establish the precedent.

From the foregoing discussion and studies it will be seen how essential is the synchronization of the elements in fast tunnel driving. With the help of multiple car loading and a corresponding decrease in car-service delays, the records already established will be exceeded.



# The MECHANIZATION PROGRAM for 1930

By G. B. SOUTHWARD

**Committee on Mechanized Mining stresses importance of keeping in touch with developments—Specialized studies on several phases of mining are recommended**

AT THE beginning of the year 1930 a review of the past five years shows very pointedly that the coal industry, whether it fully realizes it or not, is definitely committed to complete mine mechanization. Mechanized mining has now been brought to the point where it may be said that some type of loading equipment is available and practicable for the seams that are now worked with hand loading. It must be understood that this statement applies to seam conditions and not to every mine as some mines are so laid out or are so nearly worked out that they would not fit in with mechanized loading as now developed. Disregarding these, however, there are still sufficient number of mines or seams with suitable conditions to produce the entire coal requirement of the United States more economically with some form of mechanized loading than with the present hand methods.

It will, of course, be some time before hand loading is discontinued and there will be more or less successful efforts to increase the present efficiency with hand loading methods. It is hardly possible that the efficiency of hand mining can be greatly improved while with mechanized mining it is not only probable but it is reasonably certain that the present performances have not yet reached the maximum tonnage production or the limit of possible cost savings. This being the case, the time is rapidly approaching when the question that a coal operator must decide will be—not whether he can afford to mechanize his mine, but whether he can afford not to.

In order to realize the truth of the foregoing paragraphs we only have to consider facts—not opinions. One of the main accomplishments in coal mine mechanization so far has been to prove the practicability of the idea and the number of successful machine installations which are now in operation have done that beyond any reasonable doubt. Another fact is the growth of mechanized loading during the last two or three years. The progress has been steadily

forward and while it is not yet similar to a snowball rolling down hill, there are some indications that this comparison may soon apply. For instance, Illinois during the year has increased its percentage of mechanized loaded coal from approximately 20 percent of the state output at the beginning of the year to over 40 percent in the later months.

The loading records which have been made at a number of mines are further concrete evidence of what already has been accomplished. At a number of mines the average performances with mechanical loaders have increased from less than 200 tons per machine shift to considerably over 300 tons. This is decidedly encouraging and, if no further improvements were to be made, mechanical loading would still have proved its practicability and economy over hand mining. What is equally or perhaps more interesting, however, are some of the outstanding performances where more than 600 tons have frequently been loaded during a shift and at times a production of over 800 tons has been reached. These figures are indicative of what may be expected in the future.

Another decidedly encouraging factor is the thought and study which is being given toward improving the present operations. Coal mining in the past has not offered much inducement toward inventive effort, as hand mining had become pretty well standardized. The introduction of mechanized loading and the possibilities that are now being seen have changed this situation, and each new invention is tending to remove some of the limitations of hand loading which have been accepted as fixed standards in the past. In the light of our present knowledge of what has been done and what is being considered, it is reasonable to expect improvements in mining methods and mining machinery until the point is reached where further changes will not be economically necessary. In other words, mechanization will continue until coal mining is on a profitable operating basis.

There are three possible lines of de-

velopment for mechanized loading to follow. One possibility is that new machines may be built that will be so different from the existing types that present-day practices will not be applicable. A second possibility is that entirely new mining methods may be designed which will involve radical modifications in our present operating practices. The third possibility is that present-day types of equipment and the present mining systems will remain more or less as they are today but that better systemization and improved methods of operation will increase the present efficiency.

There is now much thought being given toward each of these three lines of development. Machines working along somewhat different principles from those now in use are under consideration for face preparation, loading, and gathering; some have gone no further than the paper design or small working models, while others have experimental devices in actual use underground. New mining layouts are being discussed and tried ranging from modifications of present systems to entirely new designs. The third line of possible development which is to improve and modify hand loading practices to conform to the machines now on the market is the one in which the most progress has been made in the past. This applies equally to methods of operation and mechanical improvements in the equipment.

It is in following these developments and keeping the industry advised of the progress that the most valuable service can be rendered to the coal industry by our mechanization survey during the next few years. It required almost a generation for the coal mines to develop and adopt machine cutting. Without cooperation and exchange of ideas between companies it will probably require another generation to develop mechanized loading and the present state of the coal industry is such that it can not afford to delay its improvements for that length of time. The main

purpose of our mechanization survey is to combine the experience which is being gained all over the country into one source and to disseminate it in collective form back to the industry. A number of ways for doing this were discussed at the recent meeting of the mechanization committee and the following is a brief account of the recommendations which were made. It is the intention for our mechanization survey to follow this program during the coming year and the reports which will be published will be along these lines as recommended.

#### THE NATIONAL COMMITTEE ON MECHANIZED MINING

A meeting of the National Committee on Mechanized Mining was held at Washington on December 6, 1929, and was attended by coal operators representing all sections of the country. The subject under discussion was the program for the work of the committee and the mechanization engineer during the year 1930 and quite a number of recommendations were made.

It was the general thought that the mechanization reports should now have a broader objective than merely to show that mechanized mining was being successfully adopted. It was therefore recommended that our work would be of increased value to the coal industry by taking the following four subjects for major consideration and covering each subject in more or less detail, as outlined in the subsequent paragraphs.

In addition to specializing on these four phases of mining, the mechanization survey will continue to report general developments in the use of all types of loading equipment, modifications and new designs in the mining systems, roof action and outstanding mechanized operations.

#### ENGINEERING STUDIES

It was recommended that the reports by the mechanization engineer should give special attention toward examining different operating methods for cutting, drilling, shooting, gathering, etc., that are being developed for use in connection with mechanized loading and should analyze and compare the effectiveness of these practices. It was further suggested that these studies should not attempt to cover an entire mine but should only include the operations from the face to the main line haulage. It was thought that up to this point comparative analyses would be of value but beyond this point the operations were apt to be governed by conditions outside of and beyond the effect of the mechanized loading.

#### SAFETY

It was recommended that operating companies should keep accident reports

in such a way as to differentiate between general accidents and those which occur as a direct result of the use of loading equipment. The committee should study safety practice codes which have been adopted by various companies with a view toward developing safety methods for general recommendations. It was further suggested that these codes should be studied in connection with the safety records at the mines where they are in use so as to determine their effectiveness in accident prevention.

#### TRAINING AND EDUCATION

The matter of training men for the operation and supervision of a mechanized mine was considered one of the most important factors in developing a high operating efficiency and it was suggested that our committee endeavor to organize material of educational value. Several methods now in use for training and educating the men were discussed, including published articles, bulletins, company classes, and university extension work. It was recommended that we assemble information on these various methods and compare the results. It was further suggested that the committee should consider the possibility of compiling and publishing educational bulletins or pamphlets which could be used by a company in its own training or by instructors in the university extension courses. The equipment manufacturers are to be asked whether they will furnish instruction sheets regarding the proper operation, maintenance, and repair of their machines.

#### COST ACCOUNTING METHODS

It was thought that there was a real necessity for studying the procedure used by different mining companies in compiling their mechanical loading costs and their production statistics. It was recommended that the committee should gather form sheets used for daily and period operating reports, cost statements, etc. It was not recommended that the committee should ask for confidential cost figures from any company but it was suggested that we investigate the possibility of securing man-hour figures on various phases of mining in actual mechanized operations. It was also suggested that the committee consider some common basis for man-hour statistics such as the kilo-man hour unit now recommended by various technical societies.

#### COAL MINE FATALITIES IN NOVEMBER

The death rate from accidents in the coal mines of the United States for the month of November was 3.44 per million tons of coal mined, as compared with 3.27 for October, 1929, and 3.18 for Novem-

ber, 1928, according to the United States Bureau of Mines. The highest death rate during the first 11 months of the present year was 4.08 for March, while the lowest rate was 3.13 for January. For bituminous mines alone the November rate was 2.87, as compared with 2.99 for the preceding month, and 2.93 for November a year ago and with 3.84 for March and 2.76 for January, the high and low points of the present year. The death rate for anthracite mines alone was 7.78, an increase over November a year ago, owing to a smaller production and a greater number of fatalities. The lowest death rate for the first 11 months of 1929 for anthracite mines was 5.04 for October, the rate for the present month being the highest.

These figures are based on accident reports received by the Bureau of Mines from state mine inspectors and on current reports to the bureau covering the production of coal. Reports for November showed that 178 deaths occurred in the coal mines of the country. Included in this number were 131 deaths in bituminous mines and 47 in anthracite mines. During November 45,677,000 tons of bituminous coal and 6,042,000 tons of anthracite were mined. For November a year ago there were reported 137 deaths and 46,788,000 tons in the bituminous mines, and 35 deaths and 7,322,000 tons in the anthracite region.

Reports for the first 11 months of 1929 showed that 1,917 deaths had occurred in connection with the mining of 548,140,000 tons of coal, which is an improvement over the same months of 1928 which showed 2,003 deaths and 525,896,000 tons. The fatality rates for the two periods were 3.50 and 3.81, respectively. The fatality rate for bituminous mines alone for the 11-month period was 3.09, based on 1,481 deaths and 479,158,000 tons; the rate for anthracite mines was 6.32, based on 436 deaths and 68,982,000 tons. The rates for the 1928 period were 3.49 for bituminous and 5.92 for anthracite.

The month of November was free from major disasters—that is, disasters causing the loss of 5 or more lives—but there were 5 such disasters in the preceding months of 1929 with a resulting loss of 83 lives. In 1928, for the same period, there were 13 major disasters which caused the death of 320 men. Based exclusively on these disasters the death rates per million tons were 0.15 for the present year and 0.61 during the corresponding 11 months a year ago.

Comparing the accident record for the period January to November, 1929, with the same months of 1928, a reduction is noted for gas or dust explosions and electricity, while slight increases are shown for the other principal causes of fatalities.

## PRACTICAL OPERATING MEN'S DEPARTMENT



# COAL

NEWELL G. ALFORD

Editor

▼  
Practical Operating Problems  
of the Coal Mining Industry  
▼



## METHOD and COST of Mining in a 100 Percent MECHANIZED MINE\*

Mining practice, methods and costs in a 100 percent mechanized mine—Detailed description of mining method employed, equipment used, and results obtained—Mine operates two shifts, eight hours each day with time between for servicing mechanical equipment and taking in supplies

By W. F. HAZEN and E. J. CHRISTY †

**T**HE mine under discussion has been owned and operated by the present company since the latter part of 1919, and up to the time of this report has produced 2,330,559 tons of coal. When acquired by the present company the mine had been operating for several years and was purchased as a fully-equipped and operating mine; therefore, the quality and character of the coal was well known and established.

From the opening of this mine until the middle of 1925 all coal was undercut by machines, loaded by hand, and gathered by mules. At this time a mechanical loading machine was put in operation and a gathering locomotive was used for collecting the coal. An electric drill was used for making shot-holes, to replace the hand auger formerly employed for this purpose. In January, 1927, another mechanical loading, gathering, and drilling unit was added, and the experiment of mechanizing the mine was continued. Daily time studies of the operations were kept until April, 1927, when the mine was closed because of the expiration of the union contract. About this time the management determined to adopt methods to prevent periodic shutdowns, and after carefully considering the records and time studies of the mechanical loaders, it was decided

to adopt plans for 100 percent mechanical operation.

Through delays and various other causes it was March 1, 1928, before everything was ready for the production of coal to be resumed on a "wage payment on unit plan," working double shift five and a half days each week, the entire production being mechanically cut, drilled, loaded, and hauled.

### GEOLOGY AND TOPOGRAPHY

Figure 1 shows typical sections of the geologic measures. The rocks are embraced in the Monongahela series of the Carboniferous system and are composed of shales, sandstones, several thick beds of limestone, and the Pittsburgh or No. 8 coal bed, the lowest member of the group. Another bed of coal 3 to 4 ft. thick, which is locally termed the meigs coal, is occasionally found near the hill-tops about 85 ft. above the No. 8 bed and is being worked locally at several small mines for domestic purposes only. From 16 to 25 ft. above the No. 8 bed is a bed of shale and coal about 12 in. thick, which may be what is termed the Pomeroy coal in other sections of this field.

From 5 to 7 ft. above No. 8 bed is limestone 12 to 15 ft. thick, about 4 ft. of shale, bony, and coal, and then another bed of limestone 24 to 27 ft. thick. Due to the difficulty which may be encountered in breaking or controlling

these two members, no attempt has been made to recover pillars between rooms in the district. The elevation at the mouth of the mine is 1,050 ft. above sea level.

The district is a plateau area dissected by shallow valleys, offering easy access by drifts to the coal bed which outcrops on the hillsides.

### CHARACTER OF COAL BED AND OVER-BURDEN

Figure 2 shows detailed sections of the Pittsburgh or No. 8 coal bed worked at this mine. The bed averages 54 to 59 in. in thickness and is made up of three distinct benches. The bottom bench is fairly uniform and is 29 to 29½ in. thick; above this bench is a ½-in. slate binder, on top of which is a bony coal that is 1½ to 2 in. thick and corresponds with the bearing-in bench usually found in the Pittsburgh or No. 8 coal bed. Over this bearing-in bench is a binder ½ in. thick, above which is the breast coal which varies from 23 to 26 in. in thickness. The coal is fairly hard in structure and breaks in cubical blocks with a bright luster.

The distinguishing features of the Pittsburgh or No. 8 bed are its bearing-in bed and binders and the pronounced face slips which run about S. 74° E. The butt slips run at an angle of 90° with the face slips and are not so pronounced.

*Immediate Roof.*—Immediately above

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† Consulting engineers, U. S. Bureau of Mines.



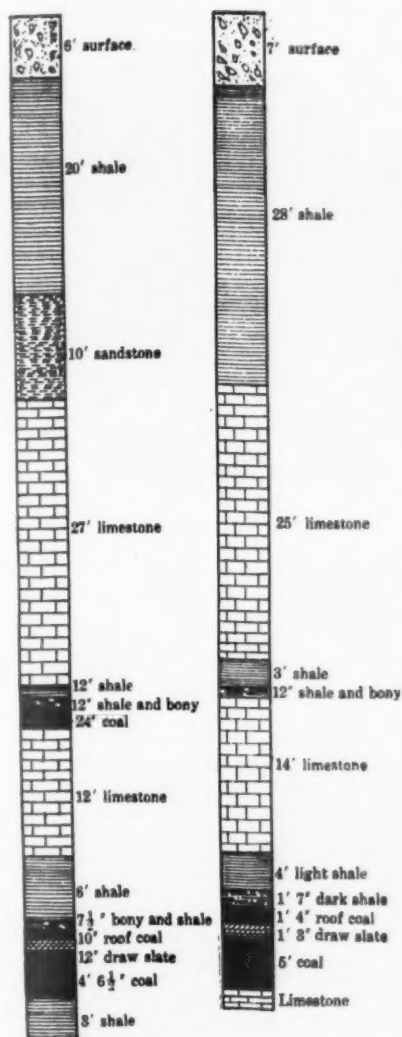


FIGURE 1—Log of two of six diamond-drill holes, giving geological sections of the Monongahela group.

the coal bed is the draw slate which is about 13 in. thick all over the mine, due to the method of blasting employed, this draw slate stays in place until the coal has been loaded out, then it has to be blasted to bring it down.

Above the draw slate is the roof coal which varies from 17 to 19 in. in thickness and which includes a shale parting varying from 1 to 3 in. in thickness 6 in. from the top. Where this shale thickens to 3 in. or more the roof coal is held with difficulty.

Above the roof coal is a treacherous soft shale 5 to 7 ft. thick which presents a difficult and expensive roof problem on account of its ready disintegration whenever exposed to the air.

Below the coal is a bed of limestone and shale 18 to 36 in. thick. The floor is hard and shows no signs of heaving.

**Cover.**—The cover over the coal bed varies from a few feet at the outcrop to

a maximum of 200 ft. under the highest points of the hills, with an average of approximately 100 ft. all over the mine.

**Faults.**—There are no displacement faults in the coal; clay veins have been encountered, but not frequently enough to constitute a mining problem. Rolls are rarely encountered, although one was struck on the main haulageway which caused the grade to be 2½ percent against the load so that it was necessary to "brush" 1,400 ft. of entry to reduce the grade to 0.5 percent against the load. The normal dip of the coal bed is 26 ft. to the mile, due south.

**Water.**—As a small amount of water is encountered at all places, the mine may be termed damp; but as the water finds easy access to the surface, no unusual problems are encountered. The water, however, has a decided acid reaction.

**Gas.**—Due to light cover and outcrop workings no gas has been found in this mine, though frequent tests are made with a flame safety lamp; the mine is termed nongassy.

**Prospecting, Exploration, and Sampling.**—As already stated, the mine was acquired when fully equipped and operating; therefore the character of the coal was well known. However, since acquiring the property the present operators have put down six diamond-drill holes whose findings are checking closely with the present underground development. An average analysis of the coal as shipped is as follows:

Constituent	Percent
Moisture	2.2
Volatile matter (dry coal)	36.6
Fixed carbon	52.4
Ash	11.0
	100.0
Sulphur	3.3
B. t. u.	12,870

#### METHODS OF DEVELOPMENT AND MINING

As the coal crops out on the hillside, the mine is opened by a drift, and the coal is delivered to the tippie by electric locomotives.

**Tippie.**—The tippie and preparation plant is of steel construction, covered with zinc-coated corrugated iron. It is equipped with car stops, cross-over dump, shaker screens, crusher, and picking tables for sizing, cleaning, and preparing the product for fuel to meet the requirements of the parent company.

**Method of Development.**—The general plan of development has been on the room-and-pillar panel method, which is characteristic of this district (Figure 3). Two entries were driven from the surface on 50-ft. centers for a distance of 600 ft., then a third entry was broken off, the centers were changed to 30 ft., and rooms were turned off the third or west entry; about 2,800 ft. from the

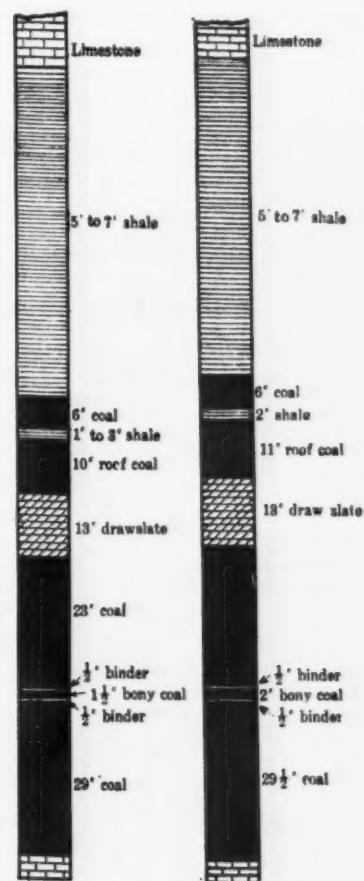


FIGURE 2—Typical cross sections of the Pittsburgh, or No. 8, coal bed and immediate roof.

mouth of the mine the fourth entry was added, thus making a set of four main face entries to develop the major part of the property. From a point about 1,300 ft. from the mouth of the mine barrier pillars 150 ft. thick are left for protection of the face entries, and pairs of butt entries are turned on either side 400 ft. apart. From these butt entries, rooms 26 ft. wide on 32-ft. centers are turned in blocks of five rooms as the entries advance, leaving a solid block of coal between each set of rooms. While the rooms are being worked their distance of 200 ft., the entries are advanced and rooms necked so that when the first block of rooms is worked out the next block is all ready to go, thus ensuring a uniform tonnage and number of working places on each entry. When the rooms have been driven the required length, the track material and about 50 percent of the posts are recovered, and the room is allowed to cave.

Because of the treacherous slate above the roof coal and the difficulty with which the two beds of limestone above the shale are broken or controlled, no attempt is made to recover room or butt entry pillars. It is planned to recover

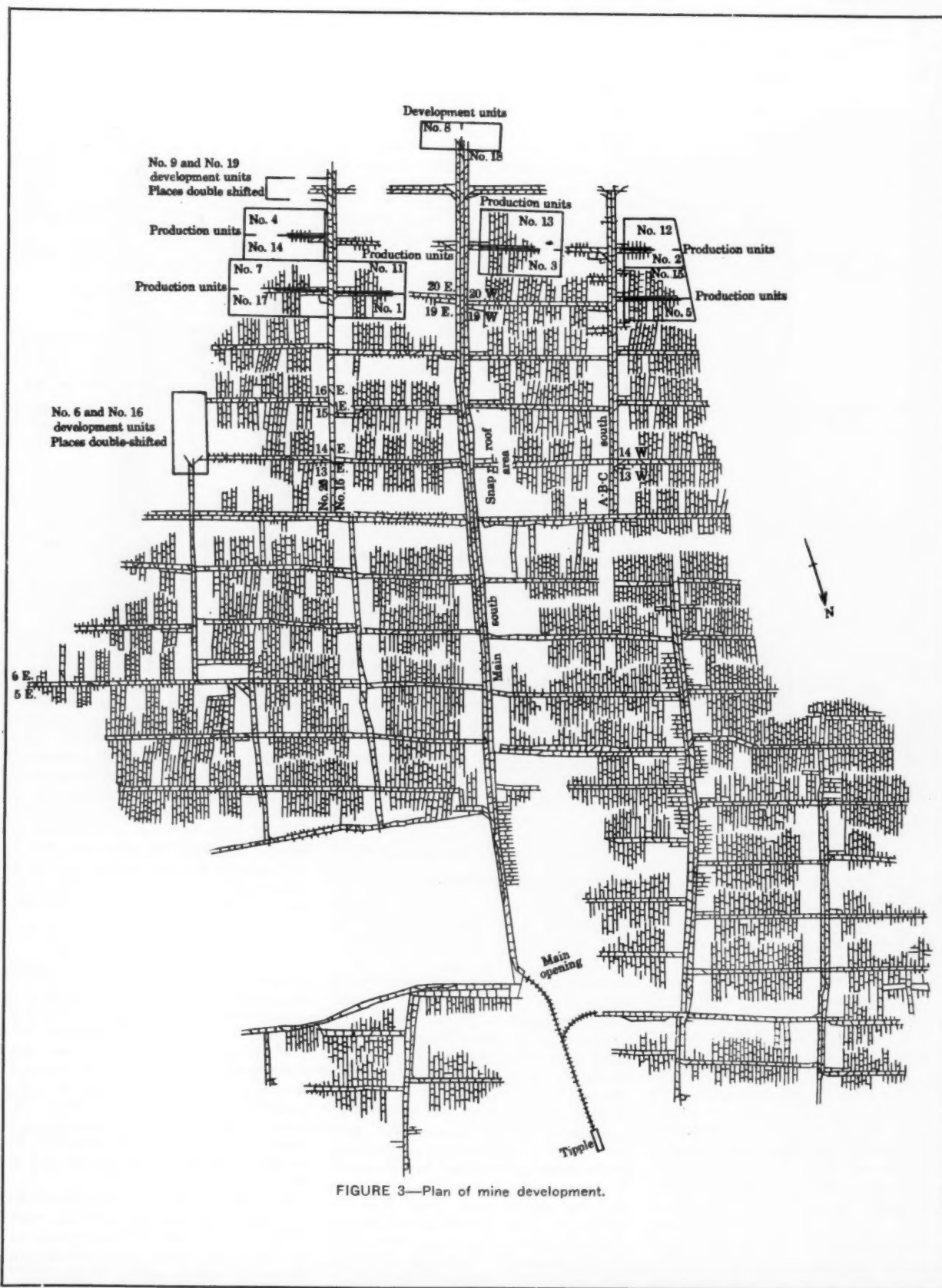


FIGURE 3—Plan of mine development.

a part of the barrier pillars by driving butt rooms on the regular room centers.

The company engineer estimates that 55 percent of the coal is extracted under the present system of mining.

As has been previously mentioned, the officials of this company have worked out an unusual method of distributing the work and of developing and operating the mine on what is known as the wage payment on unit plan.

The work of developing a pair of butt entries is performed by a crew of nine men called a "narrow unit." The crew consists of a loading-machine operator and helper; a cutting-machine operator and helper, who also drill all the shot holes for blasting the coal and slate; a motorman and trip rider who trims the cars during the loading operation; one track layer who lays all the track and switches; one shot firer who handles all the explosives, tamps and shoots the coal and draw slate, scrapes all the cuttings from the kerf before shooting, and helps drill shot holes when necessary; and one stoneman who takes down the draw slate after the coal has been loaded out and helps load it or throw it back out of the way. This narrow unit or crew proceeds with the development of the entry until five rooms have been necked. The crew is paid on the narrow-unit bases—all members are paid on a tonnage rate, established from the base rate of pay for the several classes of work. A narrow-unit crew has the following equipment: One loading machine, one short-wall mining machine, one electric drill for drilling shot holes, one 4-ton cable-reel gathering locomotive, and 16 mine cars. The night-shift unit uses the same equipment and has the same number of men to develop the parallel entry and the rooms off it, thus the equipment is double-shifted but not the territory. (See Figure 4.)

When a pair of butts has been developed for five room-lengths, the area is turned over to a "wide unit" who work the five rooms and drive the entry, necking the rooms as they advance for another block of five rooms; this crew is paid on the wide-unit basis. A wide unit has three men in addition to those employed in a narrow unit—a timberman who sets all the room posts, and two extra slate men who throw the draw slate back in the gob—and has the same equipment as the narrow unit, except that 27 mine cars are assigned to it, whereas a narrow unit has only 16 cars. The wide unit does all the work pertaining to taking the coal from the face and putting the cars on the parting to be picked up by the main-haulage motor. The operating crew recovers all the track in the rooms as the entry advances, and when the last five-room block is finished the crew proceeds to the next en-

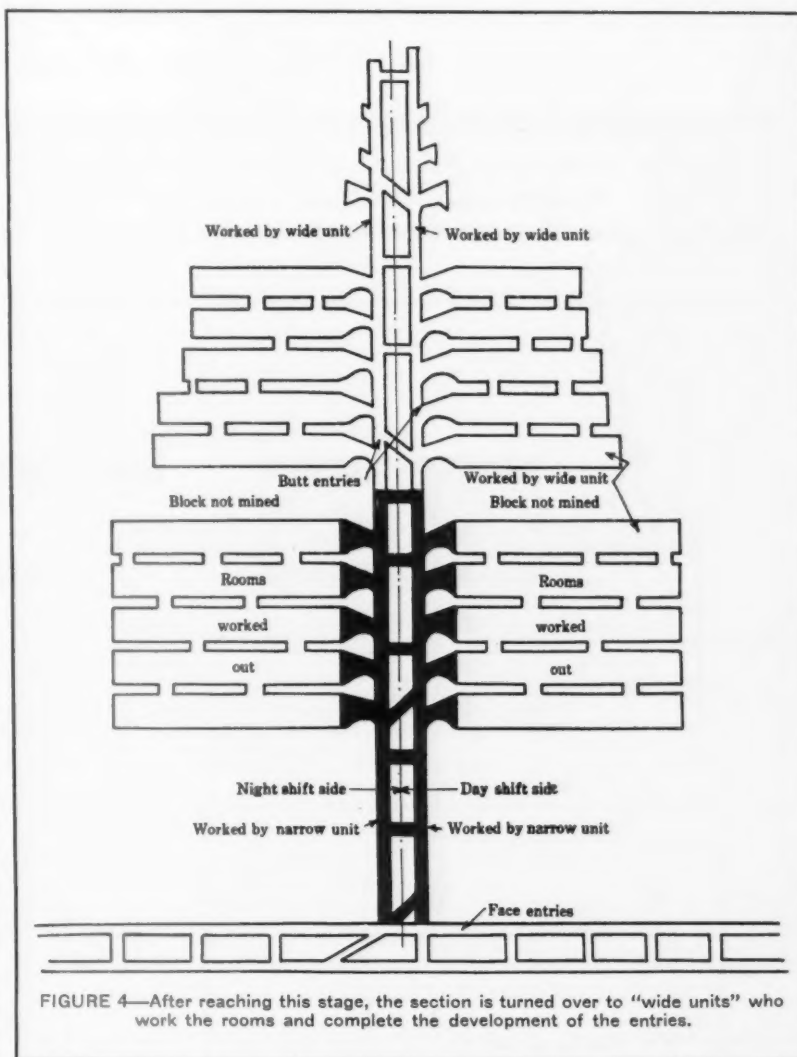


FIGURE 4—After reaching this stage, the section is turned over to "wide units" who work the rooms and complete the development of the entries.

try; the track in the last five rooms is then recovered by the maintenance crew, who also pulls all the posts that are recovered.

The development of face entries is carried on double shift on a narrow-unit basis, and the coal is charged to separate unit accounts. In addition to these units, a maintenance crew of 25 men is employed on both shifts and is composed of motormen, pumpers, timbermen, and a crew of seven men known as the "flying squadron" who fill in on the various units while any of the members are absent. There are also two foremen on each shift who are responsible for all the operations in their respective districts.

A force of 12 men, mechanics and repairmen, are employed for the two shifts; they overhaul, service, and repair the mechanical equipment. By this plan two mines are worked single shift, except face or development entries, while all equipment is double-shifted.

**Mining.**—All of the coal produced is undercut by electrically driven short-wall mining machines equipped with 6-ft. cutter bars. There are 9 machines, and all are worked double shift, one for each unit.

Table I gives the daily average tonnage produced, the average number of tons per shift, number of shifts worked, and the total coal produced during February, 1929, by each of the 18 units, 12 of which are wide units and 6 are narrow units. There were 20 full working days and four half days or Saturdays during that month. The equipment on each unit was as follows: 1 mechanical loading machine, 1 cutting machine, 1 electric drill, 1 gathering locomotive, 27 mine cars for a wide unit, and 16 mine cars for a narrow unit.

The foregoing table shows that 34,299.60 tons of coal was produced from wide units by six mining machines, a daily average of 259.84 tons per machine, and 9,783.85 tons from narrow units by



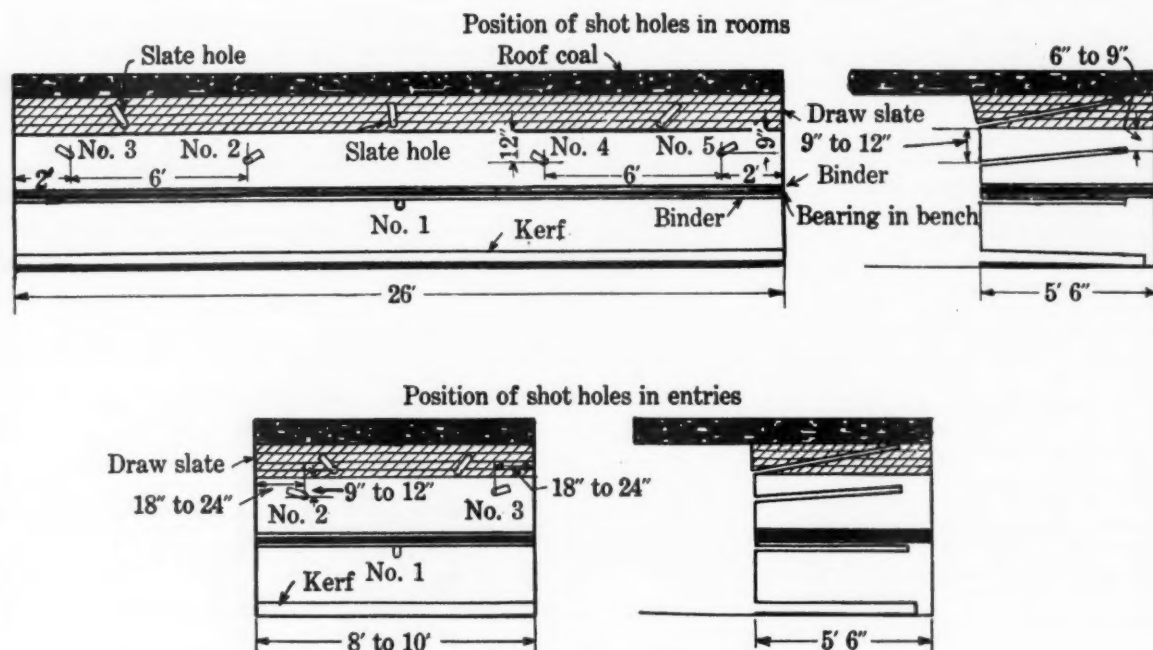


FIGURE 5—Position of shot holes for blasting. The shot holes are fired in the order of the number of the hole. Shot holes in the draw slate are fired after the coal is loaded out.

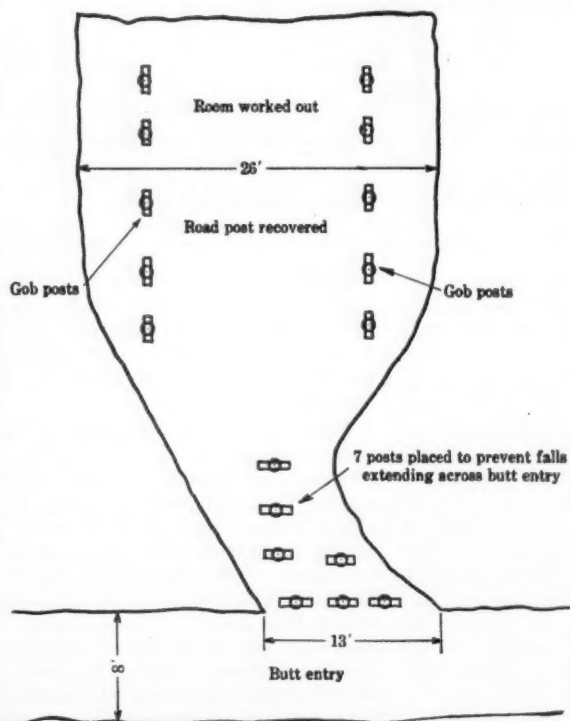


FIGURE 6—Showing how room necks are turned to avoid excessively wide stretches and at the same time to allow the mechanical loader to enter the room with ease. The method of posting in room necks to prevent falls extending to the butt entries when rooms are worked out is also shown

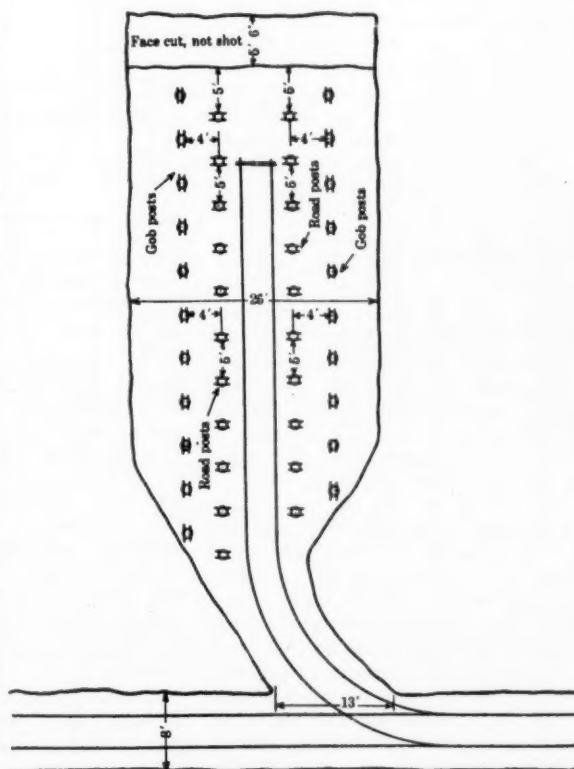


FIGURE 8—Method of room posting.

three mining machines, a daily average of 148.24 tons per machine, or a total production of 44,083.45 tons, a daily average for nine machines of 222.64 tons per machine.

**Drilling and Blasting.**—The shot holes for breaking down the coal and draw slate are drilled by the machinemen, sometimes assisted by the shot firer, who use a small unmounted electric drill. The auger used is 6 ft. long and is sharpened like a regular coal auger with only one cutting edge.

In rooms five shot holes are used in the coal and three in the draw slate. Each group of holes are drilled on the same level and 4 to 6 in. shorter than the kerf, as shown in Figure 5. The shot hole fired first is No. 1, which is placed just above or below the binder of the "bearing-in bench"; three sticks of explosive are used. The next shots fired are the two lifters, which are drilled about 8 ft. from each rib, 12 in. below the draw slate, and with a slight incline toward the center of the face; two sticks of explosive are used in these shots. The two rib shots are fired next; these holes are drilled about 2 ft. from each rib, 9 in. below the draw slate, and are slightly inclined toward the corners of the face to insure breaking the corners down. All of these shot holes are drilled as near level as possible.

When the coal has been loaded out of the rooms the draw slate is shot down; three shot holes are drilled for this purpose, one about in the center of the face and one about 4 ft. from each rib, slightly inclined to the corners; one-half of a stick of black pellet powder is used in each hole.

In the entries three shot holes are drilled in the coal and two in the draw slate. One shot hole, in which four sticks of explosive are used, is placed in the center just above or just below the binders; this shot is fired first. The two rib holes are drilled 18 to 24 in. from the rib, slightly inclined to the corners, 9 to 12 in. below the draw slate, and as nearly level as possible; three sticks of explosive are used in each hole.

When the coal is loaded in the entries the draw slate is shot down by firing two holes placed about 3 ft. from each rib, slightly inclined to the corners and upward to the roof; one-half of a stick of black pellet powder is used in each of these holes.

Before shooting, the cuttings are scraped from the kerf by the shot firer, who loads, tamps, and shoots all shot holes electrically.

During the period May 1, 1928, to April 30, 1929, 97,718 pounds of explosive was used to produce 477,273.10 tons of coal, equivalent to 4.88 tons of coal per pound of explosive used.

**Rooms.**—Room necks 13 ft. wide are turned off the butt entries on 32-ft. cen-

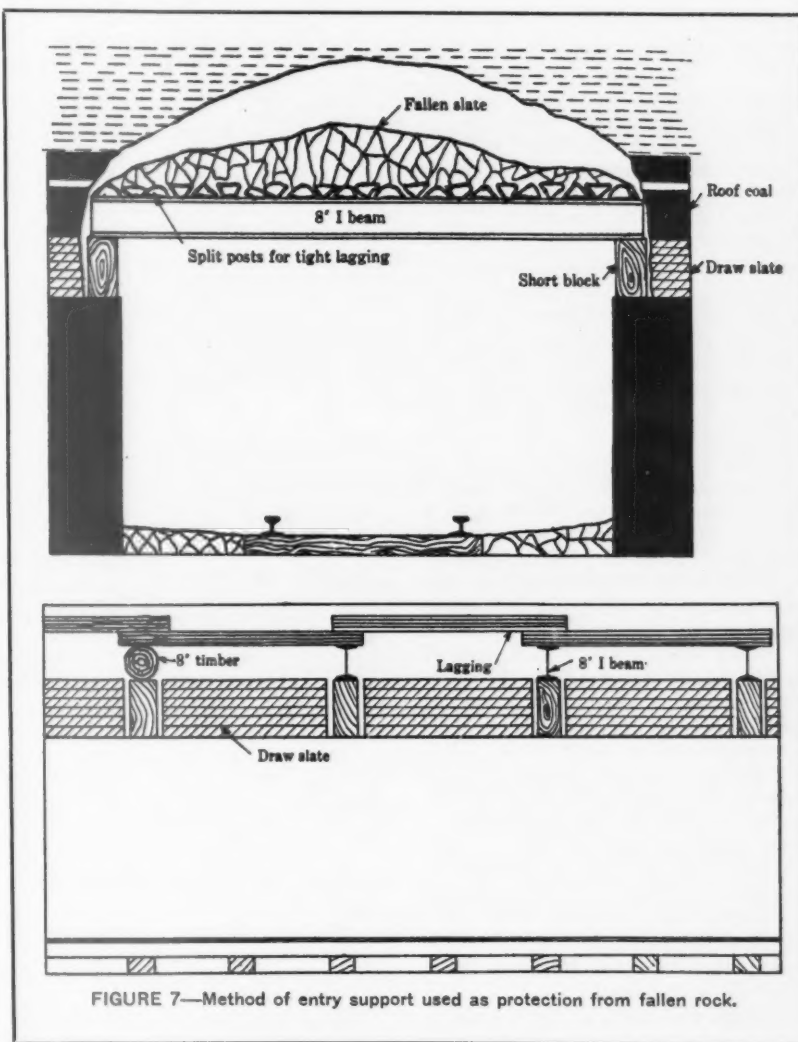


FIGURE 7—Method of entry support used as protection from fallen rock.

ters for a distance of two cuts or 11 ft., as shown in Figure 6, and are then widened out fanwise to a width of 26 ft. on the face slips. This leaves a pillar 6 ft. thick between rooms, which are driven a distance of 200 ft. from the butt entry; at this distance the rooms connect with the room from the adjoining butt entry. The track is laid 9 in. off the center of the room.

When the rooms have been driven the required distance of 200 ft., the track material and about 50 percent of the posts are recovered, and the roof is allowed to cave.

**Entries.**—Entries 8 ft. wide are advanced on the face slips for face entries and on the butt slips for butt or room entries. The face or main entries are double-shifted and are worked by a narrow unit consisting of nine men who perform all the work of cutting, blasting, mechanical loading, and placing the coal on the pass-by to be picked up by the main-haulage motor. This crew of men is paid on a narrow-unit basis.

After the development period is reached on the butt entries, the work of advancing the rooms and one butt entry is turned over to a wide unit, who must advance the entry the distance of the next five rooms and turn the room necks as the advance is made. This work is paid for on a wide-unit basis.

The extra compensation which is generally paid in coal mines in the form of yardage is covered at this property in the wage payment plan on unit basis.

**Loading.**—All coal at this mine since March 1, 1928, has been mechanically loaded by electrically driven machines, nine of which are in operation; all are double-shifted, and excepting in face entries they do not work in the same territory. Each shift or unit has its own district. During February, 1929, 44,083 tons of coal was loaded, a daily average of 222.64 tons per machine. The wide units loaded a daily average of 259.84 tons per machine and the narrow units a daily average of 148.24 tons. (For a

detailed production record of all units see Table I.)

**Deadwork.**—The principal items under the head of deadwork that influence the mining cost are the difference paid between the narrow and wide units in the wage payment plan on unit basis, the cleaning of falls on haulage and airways, and the hauling and disposal of slate on the surface.

The items of deadwork necessary for each unit to perform which are included in the unit rate are blasting, cleaning the coal of impurities, and laying all track, including switches, in the district. This also involves the care of the roof and its support, which is general practice in the district.

**Timbering.**—The immediate roof is the stratum of roof coal immediately above the draw slate. When this is held, it forms a good roof in rooms and butt entries which are not of long life, but in face entries which have been open for some time it is difficult to hold without extensive support. This support is furnished in the shape of 6, 8, and 10-in. I-beams, lengths of 60-pound T-rails, and wooden crossbars 8 to 10 in. in diameter. These roof supports or crossbars are placed on short blocks which rest on the coal, as in *Figure 7*. Tight lagging of split posts is used for practically all entry roof support.

The main haulageway has been coated for a distance of 1,400 ft. with about ¾-in. layer of gunite to eliminate the necessity of roof supports. This work has been completed for more than a year, is standing well, and seems to be doing the work intended for it.

No rules for a definite system of posting in rooms have been adopted. However, the general plan as shown in *Figure 8* is to use four rows of posts in rooms 26 ft. wide. The road posts are placed 20 to 24 in. on either side of the track and 4 to 5 ft. apart. A row of gob posts is used on each side about 4 ft. from the road posts and 4 to 5 ft. apart. When the room is worked out, most of the road posts are recovered. Cap pieces 6 in. wide, 12 in. long, and 1 to 2 in. thick are used on all posts. When the face is cut the two rows of road posts are placed within 4 to 5 ft. of the face before shooting. When the rooms are worked out, seven posts are placed in the room neck with large cap pieces, as shown in *Figure 6*.

During the period May 1 to December 31, 1928, when 297,347 tons of coal was produced, the following timber was used for roof support; 64,243 posts, equal to 385,458 linear feet and 4.63 tons of coal per post, and 0.7714 ton per linear foot of posts; also 80,844 cap pieces equal to 3.68 tons of coal each.

**Haulage.**—Mine tracks, size of trip, and equipment have been standardized.

TABLE I—TIME WORKED AND COAL MINED DURING FEBRUARY, 1929

Unit No.	Machine No.	Shift	Period	Total tons produced	Average daily tonnage
1	1	Day	1-15	1,599.05	133.25
1	1	Day	16-28	1,497.80	149.78
			1-28	3,096.85	140.76
11	1	Night	1-15	1,579.25	131.60
11	1	Night	16-28	1,386.55	138.65
			1-28	2,965.80	134.81
Total coal cut by No. 1 machine, tons.....				6,062.65	275.57
2	2	Day	1-15	1,324.50	110.37
2	2	Day	16-28	1,258.10	125.81
			1-28	2,582.60	117.30
12	2	Night	1-15	1,587.10	132.25
12	2	Night	16-28	1,343.70	134.37
			1-28	2,930.80	133.22
Total coal cut by No. 2 machine, tons.....				5,513.40	250.61
3	3	Day	1-15	1,498.10	124.84
3	3	Day	16-28	1,265.80	126.58
			1-28	2,763.90	125.63
13	3	Night	1-15	1,507.90	125.65
13	3	Night	16-28	1,243.00	124.30
			1-28	2,750.90	125.05
Total coal cut by No. 3 machine, tons.....				5,514.80	250.67
4	4	Day	1-15	1,565.10	130.42
4	4	Day	16-28	1,218.20	121.82
			1-28	2,783.30	126.51
14	4	Night	1-15	1,639.25	136.60
14	4	Night	16-28	1,402.50	149.25
			1-28	3,131.75	142.35
Total coal cut by No. 4 machine, tons.....				5,915.05	268.86
5	5	Day	1-15	1,828.55	152.37
5	5	Day	16-28	1,357.20	135.72
			1-28	3,185.75	144.81
15	5	Night	1-15	1,596.90	133.07
15	5	Night	16-28	1,255.35	128.53
			1-28	2,882.25	131.01
Total coal cut by No. 5 machine, tons.....				6,068.00	275.82
Narrow Unit					
6	6	Day	1-15	754.95	62.91
6	6	Day	16-28	702.40	70.24
			1-28	1,457.35	66.28
16	6	Night	1-15	835.95	69.66
16	6	Night	16-28	761.85	76.18
			1-28	1,597.80	72.63
Total coal cut by No. 6 machine, tons.....				3,055.15	138.87
7	7	Day	1-15	1,288.00	107.35
7	7	Day	16-28	1,130.30	113.03
			1-28	2,418.30	109.92
17	7	Night	1-15	1,556.55	129.71
17	7	Night	16-28	1,250.85	125.08
			1-28	2,807.40	127.61
Total coal cut by No. 7 machine, tons.....				5,225.70	237.53
Narrow Unit					
8	8	Day	1-15	791.30	65.94
8	8	Day	16-28	761.70	76.17
			1-28	1,553.00	70.59
18	8	Night	1-15	885.45	73.78
18	8	Night	16-28	792.80	79.28
			1-28	1,678.25	76.28
Total coal cut by No. 8 machine, tons.....				3,231.25	146.87
Narrow Unit					
9	9	Day	1-15	845.95	70.49
9	9	Day	16-28	806.65	80.66
			1-28	1,652.60	75.12
19	9	Night	1-15	972.20	81.01
19	9	Night	16-28	872.65	87.26
			1-28	1,844.85	88.86
Total coal cut by No. 9 machine, tons.....				3,497.45	159.97

The track gage is 42 in. On the main haulageway 60-pound rail is laid on 4 by 6-in. by 5-ft. oak ties on 18-in. centers; on the secondary haulageways 40-pound rail is laid on 4 by 6-in. by 5-ft. oak ties on 24-in. centers. The standard radii of curves and switches on main and secondary haulage tracks are 112

ft. for No. 4 frogs and 63 ft. for No. 3 frogs.

In the butt entries and rooms 25-pound rail with ties on 24-in. centers are used with a No. 1¼ frog for room turnouts on a radius of 21 ft.

Cars are delivered to and from the loading machine at the face by an elec-



tric gathering locomotive, the motorman and trip rider being paid on a tonnage basis calculated from the standard base rate of pay for that class of work.

Tables II and III give detail of the work accomplished on the main and secondary haulage. During February, 1929, 44,083.45 tons was produced, 21,493.65 tons of which was produced on the day shift, with an average daily tonnage of 976.98 tons. The average weight of coal in the car was 3.06 tons; the weight of the empty car is 1.88 tons. The length of main haul is 0.87 mile, and 41,686.20 ton-miles of work was accomplished, or 1.9395 ton-miles of work on the main haulage per ton of coal produced in 22 full 8-hour shifts.

On the night shift 22,589.80 tons of coal was produced with a daily average of 1,026.81 tons. The average weight of coal in the car was 3.12 tons. The length of haul was 0.87 mile and weight of empty car was 1.88 tons; 43,353.15 ton-miles of work was accomplished, or 1.9191 ton-miles of work on the main haulage per ton of coal produced in 22 full 8-hour shifts. One 15-ton locomotive was employed on each shift.

On the secondary haulage the average length of haul is 0.63 mile; during the same period 62,104.20 ton-miles of work was accomplished; 30,521.49 ton-miles on the day shift hauling 21,493.65 tons of coal, and 31,582.71 on the night shift hauling 22,589.80 tons of coal, or 1.4087 ton-miles of work on the secondary haulage for each ton of coal produced.

On the gathering haulage the coal is taken from the mechanical loader at the face by cable-reel gathering locomotives. One locomotive serves the loader in each unit and deposits it on the side track at the mouth of the butt entry where it is picked up by the secondary haulage motor. A detail of cars hauled and tons produced is given in Table II.

TABLE II—WORK OF ONE 15-TON MAIN-HAULAGE LOCOMOTIVE ON TWO EIGHT-HOUR SHIFTS DURING FEBRUARY, 1929

Item	Day shift	Night shift
Shifts worked.....	22	22
Cars hauled.....	7,027	7,240
Coal, tons.....	21,493.65	22,589.80
Average coal per shift, tons..	976.98	1,026.81
Average coal in car, tons....	3.06	3.12
Weight of empty car, tons....	1.88	1.88
Distance hauled, mile.....	0.87	0.87
Work done in hauling coal, ton-miles.....	18,699.48	19,663.13
Work done in hauling car, ton-miles.....	22,986.72	23,690.03
Total work in haulage, ton-miles.....	41,686.20	43,353.15
Work done per ton of coal produced, ton-miles.....	1.9395	1.9191

**Mine Cars.**—The cars used are of steel with wooden bottoms, equipped with end gates, 16-in. wheels with Timken bearings, and ratchet brakes; they have a capacity of 102 cu. ft. During February, 1929, 14,269 cars were dumped at the tipple; these contained 44,083.45 tons of coal, an average load of 3.09 tons for

TABLE III—SECONDARY HAULAGE, 1 TO 15 TON LOCOMOTIVE, FEBRUARY, 1929

		Average weight with coal, 3.09 tons. Weight empty, 1.88					
No.	unit	Shift	Length of haul, mile	Cars	Tons produced	Ton-miles coal	Total ton-miles
No. 1	unit	Day	0.63	952	3,096.85	1,952.02	4,278.18
No. 11	unit	Night	0.63	933	2,965.80	1,865.45	3,978.54
No. 2	unit	Day	0.68	783	2,582.60	1,756.16	3,756.77
No. 12	unit	Night	0.68	910	2,930.80	1,992.94	4,319.62
No. 3	unit	Day	0.51	912	2,763.90	1,494.70	3,243.55
No. 13	unit	Night	0.51	896	2,750.90	1,402.95	3,121.01
No. 4	unit	Day	0.70	898	2,783.30	1,948.31	4,311.84
No. 14	unit	Night	0.70	1,018	3,131.75	2,192.22	4,871.59
No. 5	unit	Day	0.63	1,049	3,185.75	2,007.02	4,491.89
No. 15	unit	Night	0.63	934	2,882.25	1,815.81	4,028.26
No. 6	unit (narrow)	Day	0.53	485	1,457.35	772.39	1,738.89
No. 16	unit (narrow)	Night	0.53	511	1,597.80	846.83	1,865.15
No. 7	unit	Day	0.64	794	2,418.30	1,547.71	3,456.39
No. 17	unit	Night	0.64	906	2,807.40	1,796.73	3,976.92
No. 8	unit (narrow)	Day	0.63	505	1,553.00	978.49	2,174.73
No. 18	unit (narrow)	Night	0.63	534	1,678.25	1,057.29	2,333.56
No. 9	unit (narrow)	Day	0.76	630	1,652.97	1,265.97	3,067.25
No. 19	unit (narrow)	Night	0.76	590	1,844.85	1,402.08	3,088.06
Total					44,083.45	28,098.07	62,104.20

each car. There are 212 of these mine cars, and each car was loaded an average of 1.53 times each shift for the 44 shifts of the period.

**Drainage and Pumps.**—As previously stated, this mine may be termed damp, as a little water is encountered everywhere. Three 35-gallon gathering pumps drain the water into a sump near the main haulage, from which point it is carried to the surface by a 6 by 8-in. wood pump having a capacity of 125 gallons per minute. The water is acidic.

**Ventilation.**—The ventilation is supplied by a 5-ft. fan belt driven by a 75-hp. electric motor, blowing 50,000 cu. ft. a minute against a 2-in. water gage.

Single board stoppings are used in crosscuts, so that the air is conducted around the mine in a continuous current. Doors are built of lumber and are hung to close with the air current.

Work is about to be commenced on an air shaft near the present working-face headings; this air shaft is expected to solve the ventilation problems at this mine.

**Power, Kind, and Voltage.**—At the mine the power furnished by a public utility company in 4,000 and 2,300 volts a. c. units is converted into 250 d. c., which is the pressure used on all underground equipment. During February, 1929, 158,228 kilowatt-hours of power was consumed at the mine to produce 44,083.45 tons of coal, thus 3.59 kilowatt-hours was consumed per ton of coal produced.

**Wage Payment Unit Plan.**—Table IV gives the scale of wages used. The wage payment on a unit basis plan provides that all the work performed is taking the coal from the face and placing it on the side track to be picked up by the secondary haulage be paid on a tonnage basis. A base rate of pay for an 8-hour day or shift was established; then a tonnage rate was calculated for development, or a narrow unit, so that it would equal the base rate when 70 tons was

produced. A narrow unit is composed of nine men: a mechanical-loader operator, mechanical-loader's helper, cutting-machine runner, cutting-machine helper (the cutting machine men with the assistance of the shot firer drill all shot holes), a shot firer, tracklayer, motorman, trip rider, and stoneman.

A wide-unit base rate for an 8-hour day is the same as the narrow-unit rate, but the tonnage rate is based on a production of 125 tons. The organization of a wide unit is the same as that of a narrow unit, with the addition of a timberman, who sets all posts in rooms, and two more stonemen, making a crew of 12 men.

When any member of a unit is absent from work, a man is taken from the replacement or flying squadron to fill his place; this man, for the period he is working in a unit, is paid on the tonnage rate for the class of labor performed.

The company furnishes all tools and explosives used by the various units.

Supervising officials are paid on a

TABLE IV—SCALE OF WAGES UNDER THE WAGE PAYMENT ON UNIT BASIS

Class of labor	Base rate, 8-hr. day per ton	Wide unit, unit per ton	Narrow unit, unit per ton
Mechanical-loader operator	\$8.00	0.064	0.114
Mechanical-loader helper	7.00	0.056	0.10
Cutting-machine runner	7.50	0.06	0.107
Cutting-machine helper	7.50	0.06	0.107
Shot firer	6.25	0.05	0.089
Track layer	6.25	0.05	0.089
Timbermen	6.25	0.05	0.089
Motormen	6.25	0.05	0.089
Trip rider	6.25	0.05	0.089
Stonemen	6.25	0.06	0.089
<b>Maintenance</b>			
Per month Per day			
Inside:			
Foremen	\$267.00		
Repairmen	185.00		
Motormen			6.14
Trip riders			6.14
Track layers			6.14
Bratticemen			6.14
Pumpers			6.14
Wiremen			6.14
Laborers			6.14
Outside:			
Shop foreman	\$250.00		
Substation man	185.00		
Blacksmith			6.24
Carpenter			5.92
Car repairers			5.92
Watchman			5.56
Outside laborers			5.56

monthly basis, and no bonus in addition to the regular wage scale is paid. Eight hours constitutes a day's work, and while the tonnage rate has been calculated from the daily base rate, using 125 tons for a wide unit and 70 tons for a narrow unit, no limit is placed on the amount of coal that may be produced.

#### SUMMARY OF COSTS

*Coal Mined During February, 1929.*—During February, 1929, which has been selected as a typical month for the purpose of arriving at the following cost percentages, 44,083.45 tons of coal was mined during 44 full 8-hour shifts: 22 day shifts and 22 night shifts. Table V gives the material and labor costs under the various items.

TABLE V—OPERATING COST PERCENTAGES

Item	Labor	Material	Total
Mining expense	52.90	18.91	71.81
Transportation	4.213	1.20	5.413
Ventilation	0.71	0.26	0.97
Tipple	3.84	0.22	4.06
Drainage	0.52	0.73	1.25
Dead work	2.27	0.17	2.44
Light, heat, power	1.23	0.59	2.12
Power purchased		4.443	4.443
Supervision	4.83	0.11	4.94
Office expense	1.54	0.29	1.83
Safety, hospital	0.01	0.004	0.014
Material handling charge	0.71		0.71
Total	72.77+	27.22+	100.00

Table VI gives the classification of labor cost under the various items for the same period.

TABLE VI—CLASSIFICATION OF LABOR, PERCENT

Class of labor	Unit costs inside	Total
Shooting	5.59	
Track layers	5.84	
Cutting	15.43	
Timber	3.71	
Stonemen	14.06	
Gathering motors	11.28	
Loaders	16.79	72.70
Inside daymen		
Mine foremen	1.13	
Assistant mine foremen	2.71	
Track layers	1.16	
Day laborers	3.53	
Bratticemen	0.56	
Wiremen	1.04	
Pumpers	0.30	
Trappers	0.14	
Supplymen	0.56	11.13
Transportation		
Motormen	1.22	
Trip riders	0.81	
Dispatchers	0.67	2.70
Outside men		
Foremen	0.76	
Clerks	1.28	
Laborers	1.53	
Electricians	0.40	
Blacksmiths	0.35	
Car repairmen	0.13	
Carpenters	0.27	
Tipple crew	5.05	
Machinists	0.36	
Watchmen	0.60	
Storeroom clerks	0.61	
Supplymen	0.41	11.75
Superintendence and engineering		1.72
Total		100.00

*Units of Labor.*—Table VII gives the total tonnage produced during February, 1929, when the mine operated 22 full

days on double shift, or a total of 44 8-hour shifts; also the number on each class of labor each shift, with the exception of 7 men on each shift known as the flying squadron, who fill the places of men absent in the units, and the servicing crew or mechanics. It also gives the average number of tons produced per shift, total shifts and man hours worked, tons per man employed on units and underground, and tons per man hour on units and underground.

The shot holes are drilled with an unmounted electric drill, using an auger with only one cutting edge as shown in Figure 5. All shots are fired by a shot firer, who uses a small electric battery for the purpose. The shot firer also scrapes all the cutting from the kerf before shooting.

*Loading.*—The loading of coal mechanically at this mine is past the experimental stage, and for the past 15 months all coal has been loaded by ma-

TABLE VII—EFFICIENCY OF PRODUCTION, WHEN WORKING 12 WIDE UNITS, 6 NARROW UNITS, DOUBLE SHIFTS, EACH 22 FULL 8-HOUR SHIFTS DURING FEBRUARY, 1929

Class of labor	Wide Day shift	Wide Night shift	Narrow Day shift	Narrow Night shift	Total Day shift	Total Night shift	Total men both shifts	Total 8-hour shifts
Mechanical-loader runners	6	6	3	3	9	9	18	396
Mechanical-loader helpers	6	6	3	3	9	9	18	396
Cutting-machine runners	6	6	3	3	9	9	18	396
Cutting-machine helpers	6	6	3	3	9	9	18	396
Shot firers	6	6	3	3	9	9	18	396
Trackmen	6	6	3	3	9	9	18	396
Timbermen	6	6			6	6	12	264
Motormen	6	6	3	3	9	9	18	396
Trip riders	6	6	3	3	9	9	18	396
Stonemen	18	18	3	3	21	21	42	924
Total men on units	72	72	27	27	99	99	198	4,356
Maintenance crew							25	550
Foremen					2	2	4	88
Total 8-hour shifts								
								4,904
Total man hours								39,952
Coal produced, tons								44,083.45
Average coal per shift, tons								1,001.55
Average coal per shift per man employed on units, tons								10.12
Average coal per shift per man underground, tons								7.63
Coal per man hour on units, tons								1.2650
Coal per man hour all men employed underground, tons								1.103

#### SUMMARY

The findings of the investigation at this mine may be summarized as follows:

*Mining Method.*—The room-and-pillar panel method of mining as used at this mine is the general practice in eastern Ohio mines. No attempt is made to recover pillars because of the treacherous nature of the immediate roof and the expected difficulty of controlling the bed of limestone 5 to 7 ft. above the coal bed.

In practice it has been found that when rooms are worked out and allowed to cave adjacent to working places, little trouble is encountered with the immediate roof. This would imply that a method may be worked out to allow leaving larger pillars between rooms, and that a systematic method of pillar recovery on break lines 1,500 to 2,000 ft. long could be made a successful operation; such a method would increase the total recovery of coal from 55 percent at present to 95 percent.

*Cutting.*—All cutting machines are double-shifted. During the period under consideration they averaged 111.32 tons of coal per shift. In addition, the cutters drilled all shot holes in the coal and slate. Greater efficiency may be obtained by using a 7½-ft. cutter bar in place of the 6-ft. cutter bar now used.

*Drilling and Blasting.*—The drilling of shot holes is part of the cutters' duties and is paid for in the cutting

chines. This is due to the efficiency of the unit system employed, where all members of the unit which load, cut, blast, and gather the coal are paid on a contract basis.

*Timbering.*—The adequacy of the method of posting used in rooms is assured by the good quality and the quantity of the posts and cap pieces furnished. On the entries, I-beams, 60-pound rail or wood crossbars with tight lagging are used; these are placed on small blocks in hitches resting on the top of the coal bed, thus eliminating the use of legs extending to the floor.

*Transportation.*—The transportation of the coal from the face to the tipple presents no unusual problems and is accomplished by the average means employed for a flat coal bed.

*General Underground Conditions.*—The general underground conditions of the mine are as good as may be found where a coal bed with a treacherous immediate roof is mined. Protection is afforded from falling slate on the entries and haulageways by tight lagging over the crossbars.

Permissible explosives fired electrically have been adopted for blasting purposes. But no rock-dust has been applied, and open-flame carbide lights are carried by all employees.

The power consumption is lower than one would expect in a complete mechanical operation; 3.57 kilowatt-hours

## SUMMARY OF EFFICIENCY DATA

Cutting machines, 9 shortwall double-shifted, average coal per shift, tons.....	111.32
Coal produced per pound of explosive, tons.....	4.88
Coal produced per linear foot of timber used, tons.....	0.7714
Coal produced per post used, tons.....	4.63
Average coal hauled by main locomotive per shift, tons.....	1,001.85
Average coal hauled by secondary locomotive per shift, tons.....	1,001.85
Total work performed on main and secondary haulage during February, 1929, ton-miles.....	147,143.56
Work on main and secondary haulage per ton of coal produced, ton-miles.....	3.8379
Average coal per gathering locomotive per shift, tons.....	111.32
Average coal per electric drill per shift, tons.....	111.32
Average number times each car is loaded per shift.....	1.53
Total power consumed in February, 1929, kilowatt-hours.....	158,228
Power consumed per ton of coal produced, kilowatt-hours.....	3.59
Coal per man employed underground, tons.....	7.96
Coal per man employed on units, tons.....	10.12
Coal per man hour underground, tons.....	0.9939
Coal per man hour on units, tons.....	1.2650
Mechanical loaders, 9 double-shifted, average tons per shift.....	111.32

Two specimen mine reports as shown below:

## MINE REPORT

Unit No. 9 (narrow unit). Bad top (entry)  
November 19, 1928

Total available working time, minutes.....	950
Coal loaded, tons.....	166
Cars loaded.....	55
Average coal per car, tons.....	3.02
Average coal per move, tons.....	10.4
Average coal per shift, tons.....	83
Time Distribution:	Minutes Percent
Loading.....	268.28 28.20
Car changes.....	(68.66)
Time used by loader on car changes.....	(11.45)
Loader wait on car changes.....	57.21 6.03
Shifting machine.....	66.53 7.01
Move machine.....	87.10 9.18
Oil machine.....	78.30 8.25
Clean up.....	47.70 5.03
No cars available.....	42.00 4.43
No coal available.....	30.20 3.37
Pick tight coal.....	1.55 0.16
No power.....	19.36 2.04
Blow cable.....	20.00 2.11
Repair loader.....	21.60 2.27
Repair track.....	25.82 2.72
Smoke.....	
Remove falls on coal.....	
Motor Delays:	
Off track.....	43.70 4.60
To passway.....	88.31 9.30
Service stonemen.....	41.15 4.34
Miscellaneous.....	11.00 1.16
Total.....	949.81 100.20
Necessary time (percent).....	63.70
Unnecessary time (percent).....	36.50
Average loading time per car, minutes.....	4.88
Number of moves.....	16
Average time per move, minutes.....	5.45
Average distance per move, feet.....	350
Average time per car change, minutes.....	1.75

## MINE REPORT

Total of reports on all wide-work units (6)  
October 24, 1928

Total available working time, minutes.....	10,939
Coal loaded, tons.....	2,921
Cars loaded.....	933
Average coal per car, tons.....	3.14
Average coal per move, tons.....	24
Average coal per shift, tons.....	129
Time Distribution:	Minutes Percent
Loading.....	3,186.18 29.18
Car changes.....	(1,259.45)
Time used by loader on car changes.....	(264.75)
Loader wait on car changes.....	994.70 9.10
Shifting machine.....	1,256.52 11.50
Move machine.....	1,377.16 12.64
Oil machine.....	479.38 4.38
Shoot coal.....	290.29 2.65
Clean up.....	59.43 0.55
No cars available.....	599.57 5.48
No coal available.....	538.56 4.93
Pick tight coal.....	257.37 2.35
No power.....	200.76 1.83
Blow cable.....	76.76 0.73
Repair loader.....	453.10 4.15
Repair track.....	88.58 0.82
Unit motor delays.....	425.14 3.89
Set post.....	43.76 0.40
Remove falls on coal.....	389.20 3.56
Smoke.....	111.46 1.02
Miscellaneous.....	91.20 0.83
Total.....	10,919.04 99.98
Necessary time (percent).....	70.00
Unnecessary time (percent).....	29.99
Average loading time per car, minutes.....	3.41
Number of moves.....	122
Average time per move, minutes.....	11.03
Average time per car change, minutes.....	1.42
Average distance per move (loader), feet.....	250
Conditions of Rooms:	
Average width, feet.....	27.42
Average height of coal cut, inches.....	55.7
Depth of cut, feet.....	5.67

MINING PRACTICE,  
BUNKER HILL &  
SULLIVAN

(from page 24)

the chutes. When sorting is necessary the ore is blasted on floors.

The waste comes into the stope about the consistency of wet concrete. It thus settles in the lagged sets to a compact mass forming a very solid wall and support for the stope. These lagged and tightly filled sets being kept close to the face, limit the area in which blasted ore may be scattered. Thus an important saving of mineral. Ventilation is better through a vertical opening. Miners are always protected by timber. The high sharp arch throws the weight of the ore on the foot-wall and the weight of the hanging wall on the solidly filled sets. This arch is developed early in the operation and carefully preserved until the stope reaches the level above. The haulage way being in the solid rock is not subject to settling. Rock chutes give greater storage capacity and require little repair.

MILLING  
PRACTICE,  
MORNING MILL

(from page 26)

A small quantity of pine oil is added to the lead filter.

This has a tendency

to make a drier cake and eliminate the sticky condition that causes trouble in the loading bins.

Average results for the years 1927 and 1928 and the month of August, 1929, are as follows:

## GRADE OF LEAD CONCENTRATES

	1927	1928	Aug., 1929
Ag. Oz. ....	33.8	32.0	25.6
Pb. % .....	65.5	71.3	74.1
Zn. % .....	8.2	6.6	5.9

## RECOVERIES IN LEAD CONCENTRATES

% Ag. ....	85.3	85.1	83.4
% Pb. ....	88.8	90.3	90.5
% Zn. ....	16.9	13.1	10.5

## GRADE OF ZINC CONCENTRATES

Ag. Oz. ....	4.8	5.2	4.2
Pb. % .....	3.2	3.6	2.7
Zn. % .....	50.4	49.6	50.9

## RECOVERIES IN ZINC CONCENTRATES

% Ag. ....	8.7	11.5	12.9
% Pb. ....	3.1	3.7	3.0
% Zn. ....	74.5	81.1	86.4

The mill and crushing plant employs 65 men per 24 hours.

Approximately 2,550 horsepower is required.

The ratio of concentration is

Lead .....	9 : 1
Zinc .....	9.5 : 1

of power was used during February, 1929, for each ton of coal produced.

**Labor.**—The wage payment on unit basis plan as worked out and applied at this property is filling a long-felt want in the coal industry, and may be successfully applied to a large number of other operations.

**Efficiency of operations.**—The efficiency of operations is summarized in the table at the top of this page.

JOINT CONFERENCE OF REPRESENTATIVES  
OF EMPLOYEES

The mining employees are divided into six classes, as follows: Loading-machine operators, loading-machine helpers, cutters and drillers, transportation employees, maintenance employees, and outside employees.

The employees select their representative for the various departments by a secret ballot at an election held each six months. Two representatives are elected at each election, the retiring rep-

resentatives being the two who receive the third lowest percentage of votes in the previous election.

The management selects six representatives. Meetings of employees and management representatives are held on the first Monday of each month to take up questions that arise in the various departments during the period, or if matters of importance need attention a special meeting is called. This plan has been in operation 15 months and has worked to the satisfaction of both employer and employee.

EMPLOYEES RELIEF ASSOCIATION AND  
INSURANCE PLAN

Each employee on being hired is interviewed in regard to supporting the Employees Relief Association and Insurance Plan. He is not compelled to join but readily does so after the plan is thoroughly explained. By joining the Employees Relief Association, for which the premium is 70 cents per month, the

employee receives the following benefits: First, the company takes out and pays all premiums on a \$500 life insurance policy as long as the employee keeps up his premium in the Relief Association; this policy is paid in full to his beneficiaries at his death, whether by natural or unnatural causes, while at work or otherwise. Second, he shall receive \$10 per week after the first full week of disability for a period of 13 weeks in any one year for any sickness or accident that is not covered by state compensation. So far the employees have given 100 percent support to this plan.



## APPROPRIATIONS FOR BUREAU OF MINES AND SURVEY BEFORE CONGRESS

Appropriations of \$2,549,480 are recommended for the Bureau of Mines during the year beginning July 1, next, by the President in transmitting the budget to Congress. This is an increase of \$274,810 over the current year. The detailed appropriations are as follows:

Investigating mine accidents \$438,640, increase of \$16,640 in order to rebuild the explosives testing laboratory at the experimental mine at Bruceton, Pa., recently destroyed by fire, and for study and testing of equipment used in promotion of mine safety work; operating mine rescue cars and stations \$330,530, increase of \$4,400, to appoint an associate engineer at Norton, Va., in the promotion of health and safety work; mineral mining investigations \$165,000 increase of \$20,780 to expedite the study of mining methods and costs; operation of helium plants \$306,190, increase of \$210,390; helium investigations \$75,000; economics of mineral industries \$307,600, increase of \$22,600, for current reports on coal distribution, additional studies of the distribution and utilization of petroleum products, and for expansion of work in mineral statistics; testing fuel \$179,210; investigating potash deposits \$100,000; mining experiment stations \$230,450; oil, gas and oil shale investigations \$232,000; mining investigations in Alaska \$11,160; care of buildings at Pittsburgh station \$82,200; general expenses \$91,500.

### Geological Survey

For the Geological Survey \$2,421,800 is recommended, an increase of \$336,000. Detailed appropriations are: supervision of leases on Indian, public, and naval oil lands \$250,000; examination and classification of lands \$180,000; topographic surveys \$811,000, increase \$176,000; water supply investigations \$300,000, increase \$25,000; geologic surveys \$400,000, increase \$50,000; fundamental research in geologic science, new provision, \$100,000; investigation of mineral resources in Alaska, \$75,000, increase \$7,500; salaries \$140,000, increase \$5,200. From the Indian Bureau the Geological Survey is given \$85,000 for supervision of mining operations on Indian lands, an increase of \$10,000.

The General Land Office is given \$700,000 for surveying public lands, a decrease of \$62,500. Of this appropriation \$50,000 is for surveys and resurveys of oil and oil shale lands. For payment to Oklahoma of 37½ percent of royalties from lands in the south half of Red River in that state in place of state and local taxes on tribal lands, \$38,000 is provided, decrease \$12,000.

The Public Health Service is given \$16,230 to investigate probable damage

to human life by fumes from the smelter at Trail, B. C., in conjunction with an investigation by the Department of Agriculture as to the affect of fumes on plant and animal life.

Under the Bureau of Standards former separate appropriations for investigation of mine, railroad and other scales are consolidated under a single appropriation of \$102,000, an increase of \$39,900 over the current year. The current appropriation for investigation of mine scales is \$13,400. For metallurgical research \$61,000 is provided, an increase of \$10,000; investigation of clay products \$49,000; standardization of equipment \$250,000, increase \$30,000.

For the Mint Service \$1,694,680 is recommended, a decrease of \$15,360.

The Treasury is given the following appropriations for recoinage purposes; of silver coins \$300,000, increase \$50,000; minor coins \$20,000, increase of \$5,000; gold coins, \$4,500, increase \$1,500.

Provision is made for a new assay office in New York and an assay office and immigration station in Seattle.

The Army is given \$4,000,000 for the purchase and transportation of fuel, an increase of \$1,000,000 and the Navy is allotted \$9,965,000 for coal and fuel, an increase of \$108,882.

Request is made that the Navy Department be authorized on approval of the President, to spend not more than \$100,000 of other naval funds for drilling wells in petroleum reserve No. 1. An appropriation of \$175,000 is requested for operation and conservation of the naval fuel reserves, of which \$100,000 is for repairs to shut in wells on reserve No. 1. The Navy is authorized to contract for \$100,000 additional for repairs to shut in wells. Of this amount \$75,000 is for operation and conservation of all naval fuel reserves exclusive of the drilling of any wells or work connected therewith. For the purchase and transportation of reserve fuel oil \$300,000 is requested, a decrease of \$150,000.

The Federal Oil Conservation Board is given \$22,220, as an appropriation of \$50,000 made in 1925 will be exhausted by July and the work of the board is only partially completed. No appropriation is recommended for protecting the interests of the Government in oil leases and lands, for which \$100,000 was appropriated last year.

The Navy is authorized to purchase \$300,000 worth of helium from the Bureau of Mines, an increase of \$70,000 over the current year. No allotment for helium for the Army is recommended, for which \$50,000 is available this year.

The total estimates for all Government services are \$3,830,445,231, a de-

crease of \$145,696,420 from the current year. Other appropriations are:

Board of Tax Appeals, \$690,000, decrease \$35,863; Board of Railroad Mediation \$328,380, decrease \$19,890; Federal Trade Commission, \$1,437,460, increase \$194,774, mainly for the electric power investigation; Federal Power Commission \$187,250, increase \$7,750; Interstate Commerce Commission \$10,329,963, increase \$2,116,138; Tariff Commission \$825,000; Shipping Board \$6,396,000, decrease \$5,327,964. No amount is specifically provided for reconditioning and operating ships for carrying coal to foreign ports, for which \$2,500,000 was appropriated during the last two years.

Appropriations for the Interior Department total \$304,302,347, a decrease of \$7,043,728. Those for the Department of Commerce amount to \$52,382,270, a decrease of \$6,584,567. The Department of Labor is given \$12,219,770, an increase of \$1,445,340, mainly for the Immigration Service, which is allowed 200 additional inspectors, and the Employment Service, which is given \$385,000, an increase of \$168,000. For the Conciliation Service \$205,000 is recommended, and the Bureau of Labor Statistics is given \$358,980.

Appropriations for carrying out the Colorado River development project will be submitted later. For flood control on the Sacramento River \$1,000,000 is provided, which will be supplemented by outside contributed funds. The Reclamation Bureau is authorized to expend \$290,000 from power revenues on irrigation projects. For operation and maintenance of Dam No. 2 and the hydroelectric power plant at Muscle Shoals, Alabama, \$260,000 is recommended, a decrease of \$10,000. For expenses of the California Debris Commission \$18,000 is recommended, an increase of \$2,660.

### METALLURGIST WANTED BY GOVERNMENT

The Civil Service Commission will receive, until January 21, applications for appointment as junior metallurgist in the Government service, at from \$2,000 to \$2,500 a year. The duties will consist of general metallurgical work connected with the fabrication of manufactured articles, either ferrous or nonferrous; general metallurgical work including process control, physical testing of metallurgical materials or ores, microphotography and research work on a large variety of metallurgical problems. The optional subjects are physical metallurgy and recovery metallurgy. Competitors will be rated on practical questions on general metallurgy, elementary physics and chemistry, the optional subject chosen and on a thesis.

## NEWS OF THE MINING FIELD

### Lake Ore Shipments Set New Record

Complete ore shipment from the head of the Lakes for the entire 1929 navigation season, issued by the Pittsburgh Steamship Company, of Duluth, show an increase of 11,223,726 tons, compared to 1928, and the largest season's shipment in all time, 65,204,600 tons. The previous record was slightly more than 64,000,000 in 1916. A total of 53,980,874 tons was shipped in 1928.

The Duluth, Missabe & Northern docks as usual shipped the most tonnage during 1929 when they sent 20,562,705 tons down the Lakes, compared to 17,454,063 tons last year. The Great Northern docks, Superior, were second with 17,355,736 tons, and the Duluth & Iron Range docks third with 6,601,735 tons. An increased draft, which remained in effect throughout the season, and unusual activity in the steel industry made the new high mark possible.

The record will probably stand for some time. The big contributing factor has been the increased production of steel ingots and finished steel. It has been estimated that this year will see 57,000,000 tons of ingots manufactured and approximately 42,100,000 tons of finished steel.

### Nevada Consolidated—Coppermines Case Is Adjourned To February

Trial of the suit of Nevada Consolidated Copper Company against Consolidated Coppermines Company in the United States district court, at Carson City, Nev., was adjourned at the close of court, November 30, until February 4, 1930, by Judge Frank H. Norcross after conferring with attorneys representing the litigants. Judge Norcross left the same night for Los Angeles to preside in the United States district court in the hearing of a suit brought by the Government against the Pan-American Petroleum Company to cancel three oil leases in California that were let to the company by former Secretary of the Interior Albert B. Fall.

The Nevada Consolidated Copper Company brought suit last May against the Consolidated Coppermines Company to restrain that company from underground mining in the vicinity of the Liberty pit of the plaintiff, and for interpretation of a contract entered into between the

two companies for the mining of ore in the territory of each other. Pending trial of the case a stipulation was entered into and filed with the court governing mining operations.

Direct testimony and cross examination of witnesses has been concluded but both contestants will put witnesses on the stand in rebuttal and it is expected that all of February will be consumed in taking testimony. The suit hinges upon the most economical method of mining disseminated copper ore at depth, by open pit or underground caving.

### Colorado Mining Association and Mining Congress Chapter to Meet January 21-22

At a special meeting of the officers and directors of the Colorado Mining Association and the Colorado Chapter of the American Mining Congress, it was decided to hold the annual meeting on Tuesday and Wednesday, January 21 and 22, 1930. The committee is now busily engaged in making arrangements for the speakers and for the "Sowbelly Dinner." Announcement of the programs will be sent out in the bulletin which will be issued early in January. The annual meeting will convene in the auditorium of the Continental Oil Building at 10 a. m., January 21, and the Sowbelly Dinner will be held at the Cosmopolitan Hotel the evening of January 21.

### Mining Institute to be Held at Seattle

The annual mining institute at the College of Mines of the University of Washington, which is open to all persons interested in any branch of the mineral industry, will be held this winter at Seattle throughout the week beginning Monday, January 20, 1930. The extensive new equipment for mining, metallurgy, and ceramics recently installed in Mines Laboratory will be used for instruction and demonstrations. In addition to the lectures by the regular staff of the college there will be talks by representative engineers and operators of the Northwest. In the evenings moving pictures of mining operations will be shown. At the last session of the Mining Institute 120 persons were in attendance. No fees are charged.

### Eagle-Picher Lead Company To Vote On Segregation

Arthur E. Bendelari, president of the Eagle-Picher Lead Company, announced December 24 that stockholders of his company would vote January 23 on a proposal to form a new auxiliary company comprising the mines and smelting properties of the present company. He said reports that his company would merge with the Consolidated Lead Company were premature.

What the Eagle-Picher Lead Company plans to do, Mr. Bendelari said, is to form the Eagle-Picher Mining and Smelting Company by withdrawing the mines and smelters from the Eagle-Picher Lead Company. Later, he said, stockholders of the Consolidated Company perhaps would vote on a similar proposal affecting its mines and smelters, and then it is probable the two new companies would be merged.

Both the Eagle-Picher and Consolidated Lead Companies are located in the Tri-State comprising chiefly Oklahoma and Kansas, with some properties in Missouri.

### Inland Steel Plans Shaft in Michigan Upper Peninsula

The Inland Steel Company, which has its headquarters in Chicago, has announced its intention of sinking a shaft on lands at Greenwood, eight miles west of Ishpeming, Mich., that have been taken under lease.

The sinking operations will not be started until next spring, but drainage ditches will be dug immediately in order that some of the surface water may be run off.

The lands which the Inland Steel Company has acquired comprise four 40-acre tracks. The property is located on section 23, township 47, north of range 28. The "forties" were taken under option 18 months ago, when the Inland Company started extensive drilling operations there. A number of holes were put down and the results have been such as to convince the Inland people that a shaft should be sunk in order to carry on further exploratory work.

The ore, which has been located by the drills, is magnetic and hard hematite. The shaft, which will be 12 ft. by 12 ft. inside the timbers, will be put down to a

depth of 1,050 ft. as the best showing of ore is at a depth of 1,000 ft.

It is the plan of the company to let a contract for the sinking of the shaft to the ledge, which is 105 ft., and the remainder of the work will be done by the Inland Company. It is expected that it will take two years to complete the sinking of the shaft.

#### **Nevada Consolidated Completes Cottrell Installation**

Operation of the Cottrell dust precipitating plant at the McGill Smelter of the Nevada Consolidated Copper Company near Ely, Nevada, was started in December. Under this system, roaster gases are passed through the Cottrell plant and finally into the new chimney, completed about a year ago.

Under the old system metal bearing particles, were merely precipitated by gravity and much metal was lost in the smoke pouring out of the roaster chimney.

In the new system, which officials declare to be the most modern Cottrell plant in operation, the fines are electrically polarized and precipitated on special plates. In this manner a high percentage of recovery is made.

A time switch controls the dozen different circuits, so that operation throughout is entirely automatic.

The new Cottrell precipitator will save from 10 to 20 tons of flue dust that was lost in the old chimney. This dust has about a 15 percent copper content. Engineers estimate that the saving made by the Cottrell plant will be sufficient to pay for the installation within two years.

#### **Oppose Bill Restricting Mining on Forest Reserves**

The mining committee of the Reno Chamber of Commerce has voiced its opposition to the Norbeck bill, introduced in the Senate by Senator Norbeck, of Oregon, which restricts operations of mineral claimants on forest reserves.

The committee, of which Henry M. Rives, secretary of the Nevada Mine Operators Association, is chairman, has recommended that the chamber of commerce request Nevada's representatives in Congress to oppose passage of the measure. Other members of the committee are: Former Governor James G. Scrugham; John A. Fulton, director Mackay School of Mines; J. C. Jones, professor of geology, Mackay School of Mines; Charles F. Spilman, editor Nevada Mining Press, and George Devore.

The Salt Lake Chamber of Commerce has adopted resolutions that voice vigorous opposition to the proposed measure, which it is declared would unjustly hamper mining operations. Section 1 of the bill restricts surface rights and forbids the taking of any resource other

than the mining deposits, or the occupancy of the land for any purpose other than prospecting or mining.

Section 2 of the bill provides that any patent issued hereafter to mineral lands on a forest reserve shall convey only the right to occupy so much of the surface as may be required for extracting and moving the mineral deposit, and that every such patent shall expressly reserve to the United States title to the surface of the land included within the claim.

#### **Republic Iron & Steel Leases Philbin Mine**

The Republic Iron & Steel Company has taken a lease of the Philbin mine, located east of Hibbing, Minn.

The property, a state fee mine, was formerly operated by the Oliver Iron Mining Company, but has been idle since 1925. The Oliver Company later surrendered its lease to Dr. D. C. Rood and others. Later Dr. Rood subleased the property to Robert McGee, paper manufacturer, and the Republic Company has acquired their holdings.

Mr. McGee appeared before various governing bodies in the township, asking that delinquent taxes owned by the past owners be canceled with the understanding that it would afford an opportunity for a company to come in, take over the mine and eventually operate it. This plea met with success.

#### **Bartlesville Zinc Company Smelter is Sold for Salvage**

The smelter of the Bartlesville Zinc Company at Bartlesville, Okla., was bought early in December by the Sonken and Galamba Corporation, salvage dealers, in one of the largest salvage purchases ever completed in the Southwest. The price was not announced.

The smelter, which has not operated for several years because of its obsolete machinery, at one time was valued at \$2,500,000.

The sale included five miles of railroad, a modern power plant and numerous brick buildings, two of which are four-story structures. The smelter covers a 75-acre tract of land.

Officials of the salvage company announced that the entire smelter will be junked. It will be dismantled and shipped to Kansas City. They estimate that 500 cars of metal and 100 cars of lumber and brick will be shipped from Bartlesville to Kansas City.

#### **Utah Copper Pays \$4 Extra Dividend**

An extra dividend of \$4 was declared on the common stock of the Utah Copper Company in addition to the regular quarterly payment of the same amount. Both dividends are payable December 31 to stock of record December 13.

#### **Four Tri-State Mines Have Worked 11 Months Without Lost-Time Accident**

Four mines of two companies operating in the Tri-State district have worked through the first 11 months of 1929 without a lost-time accident, according to records maintained by the accident prevention department of the Tri-State Zinc and Lead Ore Producers' Association.

Three of the mines, the Beaver, Jay Bird, and Wilbur, are properties of the Commerce Mining and Royalty Company. The fourth mine is the No. 24 mine of the Evans-Wallower Lead Company.

#### **Bankruptcy Suit Filed Against Missouri-Kansas Zinc Corporation**

An involuntary petition in bankruptcy was filed in Federal court at New York, December 23, against the Missouri-Kansas Zinc Corporation, whose properties are located at Waco, Mo. Liabilities were estimated at \$1,260,000 and assets at \$750,000.

The petitioners are Benjamin Graham, who claims \$2,564.04; Margaret T. Ryan, \$900, and Ray Stricks, \$1,282.03.

Walter E. Ernst, one of the attorneys for the corporation, said that the purpose of filing the petition was to affect and consummate a reorganization. Definite plans are now being considered and will be announced shortly. In the meantime, he said, the mine is in good condition and operations are being continued.

#### **George Notman Dies**

George Notman, retired officer of the Phelps Dodge Corporation, died December 13. He was 77 years old.

Mr. Notman for many years was secretary and treasurer of the Phelps Dodge Corporation, from which he retired several years ago. His home was in Brooklyn, N. Y.

#### **Daniel M. Barringer Dead**

Daniel Moreau Barringer, noted geologist and mining expert, died November 30 from a heart attack at his home, Haverford, Pa., at the age of 69.

Mr. Barringer was graduated from Princeton in 1879 and then studied law at the University of Pennsylvania. He practiced law until he entered the field of geology and mining engineering. In conjunction with John Stokes Adams, he wrote a standard work on mining law and also was author of many scientific papers.

Mr. Barringer is credited with the discovery of the origin of the famous Meteor Crater in Arizona and the location of the body which formed it.



### Charles J. Stakel Succeeds Eaton With Cleveland-Cliffs

Lucien Eaton, who for several years has been superintendent of the Ishpeming district mines for the Cleveland-Cliffs Iron Company, has resigned and will be succeeded by Charles J. Stakel, superintendent of the North Lake district.

Mr. Eaton, who has been associated with the Cleveland-Cliffs Iron Company since July 15, 1902, is a graduate of Harvard University and he came to Ishpeming shortly after he completed his studies. Since August 1 he has been in Northern Rhodesia, South Africa, engaged as a consulting engineer, having taken a position as an official of the Selective Corporation, a mining concern which operates copper properties in South Africa. He will devote a part of his time to consultation engineering work.

Mr. Stakel, who succeeds Mr. Eaton, entered the employ of the Cleveland-Cliffs Company August 1, 1905, and was made superintendent of the company's Republic mine April 1, 1916, and on April 15, 1925, he took charge of the North Lake district.

Mr. Stakel will continue to be in charge of the Morris-Lloyd property at North Lake and his new duties will include the Cliffs shaft and Holmes mines in Ishpeming.

William R. Myers will continue as head of the engineering department and also as superintendent of the Spies-Virgil mine at Iron River and the Tilden open pit property on the Cliffs Drive.

### Shimmin With Collins Western Corp.

J. T. Shimmin has resigned his position as Chief Engineer of the Metallurgical Department with the Southwestern Engineering Corporation, and has joined the staff of the Collins Western Corporation, Engineers, Los Angeles, Calif., as Manager of the Metallurgical Division, where he will continue the work of ore testing, mill design and construction.

### Wardlaw Goes To Inspiration Copper As Superintendent of Mines

Frank A. Wardlaw, superintendent of mines for the International Smelting Company, left Salt Lake, December 1, to assume a position as general superintendent of mines, Inspiration Consolidated Copper Company, succeeding Clyde E. Weed, formerly assistant manager, who goes to Greene-Canaan as general manager. Wardlaw has been superintendent of the Utah Delaware for a number of years and also of the Vipont Silver in Idaho.

H. A. Geisendorfer has been named as general superintendent of mines for the International Company, to succeed Mr. Wardlaw.

### T. H. O'BRIEN ELECTED GOVERNOR OF ARIZONA CHAPTER

T. H. O'Brien, General Manager of Inspiration Consolidated, of Miami, was elected Governor of the Arizona Chapter of The American Mining Congress at the annual meeting at Phoenix December 9. He succeeds H. A. Clark, of Bisbee, General Manager of Calumet & Arizona.

M. Curley, of New Cornelia, of Ajo, was named first vice president; William Koerner, of Magma, second vice president, and W. B. Gohring was re-elected secretary.

Representatives of the state's major mines and several industrial leaders of Arizona attended the meeting. The discussion centered around the problem of sale of copper now being produced by Arizona mines, approximately one-fourth of the world's supply. Operators were reluctant to prophesy the continued sale of such an amount during the coming months.

The following directors were elected: Frank Ayer, I. H. Barkdoll, P. G. Beckett, W. S. Boyd, H. A. Clark, M. Curley, W. Val DeCamp, J. G. Flynn, J. P. Hodgson, Wm. Koerner, F. W. MacLennan, T. H. O'Brien, Brent Rickard, R. E. Tally, R. W. Thomas, F. A. Woodward.

### E. E. Barker Leaves Utah Copper for Position in Northern Rhodesia

E. E. Barker, of Salt Lake City, Engineer of Mines for the Utah Copper Company, has gone to Northern Rhodesia, where he has accepted a position as general manager of the Mufulira mine for the Rhodesian Selection Trust, Ltd., of London, England. Prior to his employment with the Utah Copper, Mr. Barker was superintendent of mines for the Chile Copper, the Cerro de Pasco, and mines at Butte and Superior. He also served as engineer of mines for the Nevada Consolidated.

### F. C. Moore Heads Northwest Association

F. Cushing Moore, formerly state mine inspector of Idaho, and later connected with the Federal Mining & Smelting Company, was chosen president of the Northwest Mining Association by the board of trustees to serve during 1930. For the past several years Mr. Moore has been a consulting engineer in Spokane.

### Zenith Mine of Pickands, Mather Awarded Safety Prize

The Zenith mine, of the Pickands, Mather Company, was awarded the annual safety prize for the best safety record of the underground properties of the company in Minnesota. A fine silk muffler was presented to each man as a reward.

This is the first time the Zenith mine has won the prize. The record of 10 months without a lost-time accident is the basis.

Pickands, Mather began safety-first work during 1913. Since then a large number of men have received training in first aid and mine rescue work.

### Two Idaho Mines Curtail Output

The Hecla Mining Company and the Federal Mining and Smelting have curtailed output as a result of the decline in lead prices. A six-day operating policy has been put into effect.

Several weeks ago, the Federal Company announced an approximate 15 percent reduction in the output of its Morning and Page mines through the laying off of between 50 and 60 men. Later F. W. Burbidge, president of the company, announced the mines would operate only six days of each week shutting down every Sunday, thus effecting an additional reduction of 10 percent in output.

The Hecla Mining Company, which has in the past shut down every other Sunday, has adopted a like policy of six-day operation, according to L. E. Hanley, secretary. With this six-day basis and the shifting of men from ore mining to "dead" or development work, the Hecla is making a reduction of approximately 15 percent in its output, Mr. Hanley said. No other curtailment is contemplated, he indicated.

### Colorado River Conference Called

On invitation of Secretary of Interior Wilbur, representatives of Arizona, California, and Nevada will confer at Phoenix on January 6 with a view of agreeing on development of the Colorado River power project. The Government will be represented by William J. Donovan. The purpose of the meeting will be to iron out differences between the states, particularly in the disposal of water impounded by the dam to be constructed. The Government hopes that an agreement can be reached by February first, to avoid Arizona from filing suit against the project because of its objection to the proposed allocation of water.

### Reduction Plant for Bagdad Copper Company

A \$7,000,000 copper ore reduction plant will be erected at the Bagdad mine of the Bagdad Copper Company at Hillside, 40 miles northwest of Prescott, Ariz., according to an announcement by George F. Thomas, general manager of the property. A research program now under way will be completed by the middle of the summer of 1930, according to Mr. Thomas, and the construction of the reduction plant will then be started. The company appropriated \$1,500,000 for experimental work and exploration of the property. About half of this sum has already been expended. A 2,000 acre site has been selected for the reduction plant and accompanying townsite. The mining property extends over an area five miles long and two miles wide. Churn drill holes to the number of 130 have been drilled to a depth of about 500 feet. A new shaft is being sunk and at the 375-foot level a station is under construction. A large hoist has been installed but is not yet in use. The property is being further explored by diamond drilling. A 50-ton flotation mill has been installed and is in operation. The concentrates are being used in the experiments for the reduction plant. The company has a patent on a process for recovering copper from the ore by means of concentration, roasting, agitation in acid solution and electrolysis. At present 102 men are employed. Jack W. Still, who has been an efficiency engineer for Miami Copper Company for a number of years, has recently accepted the position of mine superintendent at Bagdad.

### Tri-State Zinc Company Buys Roberts Milling Company's Plant

The Tri-State Zinc Company has taken an operating option on the Roberts Milling Company's tailing mill, located on the old Dorothy Bill No. 1 lease, west of Picher, Okla. The Canadian Mining and Development Company, which was formed by the owners of the Dorothy Bill after the mine was depleted, worked much of the richer sands at the mine before the plant was sold to the Roberts Milling Company.

### War Minerals Cases

In reporting to Congress on the status of war mineral claims as of November 30 last, Secretary of Interior Wilbur states that the District of Columbia Supreme Court has under advisement 37 suits of war mineral claimants for recovery under the act of February 13 last authorizing a review of legal points involved and covering claims for purchase of property and interest on borrowed capital. There is an unexpended balance of \$946,705 from the \$8,000,000 appropriated for paying war mineral claims.

### E. L. Griffith to Head West Virginia Mining Institute

E. L. Griffith, Clarksburg, was elected president of the West Virginia Mining Institute at the twenty-second annual session at Fairmont, W. Va., November 26.

Officers elected also included: W. E. Koepler, Bluefield, first vice president; Thomas G. Fear, Fairmont, second vice president; M. L. Graver, Mt. Hope, third vice president; John Koch, Wheeling, fourth vice president; E. E. Shirver, Nellis, fifth vice president; Charles E. Lawall, Morgantown, secretary-treasurer; Josiah Keely, Kayford, D. L. Brown, Grant Town; J. W. Bischoff, Omar, and Lee S. Taylor, Widen, executive committee members.

### Ontario Mine Output Up

A production valued at \$110,000,000 from the mines of Ontario during 1929 is predicted in the annual report of Charles McCrear, Minister of Mines. This total would represent an increase of 10 percent over the same all-inclusive total for the same period of 1928. Metallic production to the end of September was \$59,442,878, as compared with \$50,675,310 at the end of September, 1928, according to the report. This represented a gain of 17.3 percent for the nine months.

### New 250-Ton Mill in Coeur d'Alene

Construction is under way on a 250-ton flotation mill at the Little Pittsburgh property on Pine Creek in the Coeur d'Alene District of Idaho. This was recently taken over by the Pine Creek Lead-Zinc Mining Company.

### A. S. A. Joins International Body

Announcement that the American Standards Association has become a member body of the International Standards Association was made at the annual meeting of the A. S. A. at the Hotel Astor, New York, on December 18 by William J. Serrill, president of the A. S. A. As the result of this action all of the national standardizing bodies except those of Great Britain, Canada and Australia are members of the International Association. The countries now represented, in addition to the United States, are: Austria, Belgium, Czechoslovakia, Denmark, Finland, France, Germany, Holland, Hungary, Italy, Japan, Norway, Poland, Roumania, Russia, Sweden and Switzerland.

Announcement was also made at the meeting of the reelection of Mr. Serrill as president and Mr. Cloyd M. Chapman as vice president for the year 1930.

### Penn State "School of Mineral Industries"

The School of Mines and Metallurgy of the Pennsylvania State College has been re-named the School of Mineral Industries by the trustees as more significant of the scope of work covered by this branch of the college.

The courses offered by the School of Mineral Industries include mining engineering, metallurgical engineering, ceramics in all of its branches, and geology with an optional major in gas and oil production. Advanced work in these fields is also offered, and research into problems affecting the industries is being conducted.

Said to be the largest mineral industries school in the East, the Penn State division has been making rapid forward strides since Captain Edward Steidle, formerly of Carnegie Institute of Technology, became dean a year and a-half ago. Each department of the school has an advisory committee composed of state leaders in its special branch, and it is through these committees that the school revives valuable suggestions in the better training of its students.

A new Mineral Industries Building was started last summer. It is to cost approximately \$500,000 and when completed for the opening of the college in September, 1930, will be not only the finest of its kind in the country, but the largest academic building on the Penn State campus. There are about 180 mineral industries students at Penn State this year.

### Utah Producers Hold Conference and Adopt Code of Trade Practice

Coal operators and allied interests met in Salt Lake City, December 3, to discuss and determine ways and means of standardizing and unifying methods of marketing coal mine products and establishing a code of trade practice that would be equitable and just to producer and consumer, alike. The conference was held under the auspices of the Utah Coal Producers Association and was sanctioned by the Federal Trade Commission.

The conference was conducted by Commissioner William E. Humphrey, while George McCorkle, assistant director of the commission's trade practice division, presided over deliberative sessions. More than 100 coal producers and dealers of the country were in attendance.

After the adoption of a trade practice code, condemning all forms of rebating, false advertising and other unethical practices, a committee of 10 men, representing the fields of Utah, Wyoming, Kentucky, Colorado, and the Southern Appalachian districts, was appointed to aid in enforcing the code throughout the entire industry.

Members of the committee are C. B. Huntress, assistant secretary of the National Coal Association at Washington, D. C.; E. R. Clayton, commissioner of the Harlan Coal Bureau, Harlan, Kentucky; R. E. Howe, commissioner of the Southern Appalachian Coal Exchange, Knoxville, Tenn.; Everett Drennen, vice president of the Colorado Fuel & Iron Company, Denver, Colo.; L. T. Dee, manager of the Southern Wyoming Coal Company, Ogden, and J. B. Marks, J. B. Smith, F. A. Sweet, W. C. Stark, and D. D. Muir, Jr., all of Salt Lake.

Immediately after the conference session, plans were laid for organization of similar committees in other districts to work out a uniform practices code, sanctioned by the Federal Trade Commission.

The keynote of the code adopted by the conference was open, honest selling by both producers and retailers and rigid adherence to national legislative acts governing the industry. With this in mind, the special committee was empowered to investigate possible infractions of these acts and report them to the Federal Trade Commission.

Among the rules laid down in the newly adopted code is one prescribing that all producers and retailers shall conspicuously post in their offices the prices and terms of sale of coal, and that these terms shall be rigidly adhered to. Each seller, however, shall determine independently the prices and terms of sale under which he shall operate.

Following the formal meetings, at a banquet given in honor of Commissioner Humphrey, at the Hotel Utah and largely attended, the commissioner outlined the new policy of cooperation between the Federal Trade Commission and business interests. The old policy of superficial investigations into big business interests, with their accompanying harmful publicity, he called unjust and tyrannical.

"Under the present policy of cooperation, when our investigators make a report and we deem the facts sufficient to warrant a complaint, we give the parties accused an opportunity to be heard before a complaint is issued," Commissioner Humphrey declared. "After hearing the respondent's side of the case, and we are still satisfied that he is violating the laws, we will permit him to sign a stipulation that he will quit such practices instead of proceeding to trial. If the stipulation is not kept, however, we use it against him.

"Under this new policy of cooperation during the last year more has been effected to protect honest business, the work of more crooks and scoundrels has been ended, and the public has been protected from unfair and fraudulent practices more than in the previous 11 years under the old system of litigation," Commissioner Humphrey declared.

## MINING CONGRESS COAL CONVENTION AND EXPOSITION AT CINCINNATI MAY 5-10

Arrangements are gradually being completed for the 7th Annual Convention of Practical Coal Operating Men and National Exposition of Coal Mining Machinery and Equipment, which is to be held in Cincinnati from May 5th to 10th, under the auspices of the Manufacturers' Division of the American Mining Congress.

P. C. Thomas, of Pittsburgh, General Manager of Mines for the Koppers Company, has been selected as Chairman of the Program Committee, and a meeting of this body has been called to convene at Pittsburgh, on January 11.



P. C. Thomas

With over considerably more than half of the available exhibit space in Cincinnati Music Hall already contracted for, this year's exposition promises to be the largest and most complete ever staged. L. W. Shugg, of the General Electric Company has again been designated as Director of Exhibits.

Coal men invited to participate in drafting the program and who are accepting this designation are as follows:

### ADVISORY COMMITTEE

Paul Weir, vice president, Bell and Zoller Coal and Mining Company, Zeigler, Ill.; Dr. L. E. Young, vice president, Pittsburgh Coal Company, Pittsburgh; George B. Harrington, president, Chicago, Wilmington and Franklin Coal Company, Chicago; W. L. Affelder, vice president, Hillman Coal & Coke Company, Pittsburgh; Ezra Van Horn, general manager, Clarkson Coal & Mining Company, Cleveland; Newell G. Alford of Howard N. Eavenson and Associates, Pittsburgh.

### GENERAL COMMITTEE

**Alabama**—J. A. Long, district manager, Woodward Iron Company, Woodward; D. A. Thomas, president, Montevallo Coal Mining Company, Birmingham.

**Arkansas and Oklahoma**—Franklin Bache, president, Kali-Inla Coal Company, Philadelphia; V. C. Robbins, mining engineer, McAlester Fuel Company, McAlester, Okla.

**Colorado**—R. L. Hair, general superintendent, fuel department, Colorado Fuel & Iron Company, Pueblo; B. W. Snodgrass, general manager, Victor-American Fuel Company, Denver.

**Illinois**—F. S. Pfahler, Superior Coal Company, Gillespie.

**Indiana**—Robert J. Smith, Princeton Mining Company, Terre Haute; Carl Fletcher, president, Fletcher Coal Company, Indianapolis.

**Kansas-Missouri-Iowa**—K. A. Spencer, chief of engineering, Pittsburg & Midway Coal Mining Company, Pittsburg, Kans.; Ira Clemens, president, Clemens Coal Company, Pittsburg, Kans.

**Kentucky**—W. G. Duncan, Jr., superintendent, W. G. Duncan Coal Company, Greenville; L. B. Abbott, division engineer, Consolidation Coal Company, Jenkins.

**Maryland**—R. P. Maloney, president, Lindsey Coal Mining Company, Oakland; W. J. Wolf, manager, Consolidation Coal Company, Frostburg.

**New Mexico**—H. D. Moses, manager, Gallup-American Coal Company, Gamero.

**Ohio**—W. E. Tytus, president, Sunday Creek Coal Company, Columbus; Barney Clay, of the M. A. Hanna Company, Cleveland.

**Pennsylvania**—R. E. Hobart, mechanical superintendent, Lehigh Coal & Navigation Company, Lansford; S. W. Blaklee, general superintendent, Pennsylvania Coal & Coke Corporation, Cresson; George J. Krebs, superintendent, Reading Iron Company, Stoyestown; Thomas Dawson, vice president, H. C. Frick Coke Company, Pittsburgh; M. D. Cooper, Hillman Coal & Coke Company, Pittsburgh.

**Utah**—D. D. Muir, United States Fuel Company, Salt Lake City; George Schultz, Liberty Fuel Company, Latuda.

**Virginia**—J. D. Rogers, Stonega Coke & Coal Company, Big Stone Gap; Lee Long, vice president, Clinchfield Coal Corporation, Dante.

**West Virginia**—P. C. Graney, general manager, C. C. B. Smokeless Coal Company, Mt. Hope; W. A. Hunt, general superintendent, Island Creek Coal Company, Holden; Thomas G. Fear, general



manager of operations, Consolidation Coal Company, Fairmont; George W. Craft, general superintendent of mining, Pocahontas Fuel Company, Pocahontas.

**Wyoming**—George B. Pryde, vice president, Union Pacific Coal Company, Rock Springs; R. E. Miller, Sheridan-Wyoming Coal Company, Kleenburn.

E. R. Coombes, of the American Mining Congress, is secretary of the Program Committee, with headquarters at 841 Munsey Building, Washington, D. C.

### Anthracite Conference Seeks Federal Economic Survey of Field—Construction Program Urged to Forestall Depression

A request for Federal aid in making an economic survey of the anthracite fields was placed before Government officials in Washington, December 11, by representatives of the Anthracite Cooperative Association, headed by Roy C. Haines, of Wilkes-Barre, President.

The visitors paid their respects to the President and later conferred with Secretary of Commerce Lamont. Formal request for aid from the Government was placed before Mr. Lamont.

In addition to asking for such aid to a survey, the delegation, which emphasized the fact that the anthracite industry is facing a period of severe depression, urged all possible Federal construction in the anthracite fields of Pennsylvania in order to assure continued employment and to stimulate general business conditions.

The economic survey requested would, in the opinion of Mr. Haines, lead to a reduction in the cost of mining anthracite and consequently a reduction in costs to the consumer.

The delegation was presented to the President by members of the House from Pennsylvania. It included, in addition to Mr. Haines, Dr. J. F. Noonan, of Mahanoy City; Colonel E. G. Smith, of Wilkes-Barre; Joseph R. Hooker, of Plymouth; Phillip Stranes, of Nanticoke, and M. J. Cosik, the latter a representative of the United Mine Workers of America.

### Consolidation Coal Buys New Dock Site in Milwaukee

As the first item in what will be an important expansion program during 1930, the Consolidation Coal Company has acquired a site in Milwaukee for the erection of a new coal dock which will be able to take care of half a million tons of coal per year and prove an outlet for all sizes and grades of Consolidation coal. This improvement will involve an expenditure of \$1,200,000, according to George J. Anderson, president of the firm.

### Lambie Heads Coal Mining Institute of America

R. M. Lambie, chief of the Department of Mines of West Virginia, was elevated to the presidency of the Coal Mining Institute of America at its 43rd annual meeting at Pittsburgh, Pa., December 12.

Lambie succeeds William Nesbit, of Greensburg, Pa.

Progress in the reduction of mining fatalities and the need for more technically trained men were the outstanding topics discussed by the delegates who represented 46 states and 12 foreign countries.

Joakim N. K. Lindholm, of Bergen, Norway, explained how coal was mined on the island of Spitzbergen, where the temperature is 25 degrees below zero.

Four mining department chiefs attended the session, including, in addition to Lambie, Dr. J. J. Rutledge, of Maryland, C. O. Smith, of Ohio, and W. H. Glasgow, of Pennsylvania.

Other officers whose elections were announced included: Vice presidents, George M. McCaa, Pittsburgh; Thomas Lowther, Indiana, Pa., and F. W. Wilkinson, Masontown, Pa.; managing directors, Ralph Bierbauer, Pittsburgh; Oscar Cartledge, Charleston, W. Va.; Silas Hall, Connellsville, Pa.; Clyde Lutton, Scottsdale, Pa.; J. D. Walker, Butler, Pa.; Francis J. Feehan, Castle Shannon, Pa.; D. L. Brown, Granttown, W. Va.; John I. Thomas, Harrisburg, Pa.; Edward Austin, Pittsburgh, and W. D. Wardrop, Barnesboro, Pa.

### Lackawanna Railroad Places Nation's Largest Coal Pocket in Service

A concrete coal pocket 300 ft. long, 40 ft. wide and 35 ft. high, surmounted by a structural steel and fire-resisting sheet metal superstructure—the largest of its type for retail purposes in the nation—was placed in operation by the Lackawanna Railroad at its South Brooklyn Terminal at 25th Street and Third Avenue, New York City, December 17.

Divided into 20 pockets, to accommodate the various sizes and grades of coal, each with a capacity of 225 tons, the bulk holding capacity of the plant will be 4,500 tons or 9,000,000 pounds.

Coal destined there will be loaded in trough hopper-bottom cars at the mine, brought to tidewater by rail and floated to Gawanis Basin, where a gas-electric locomotive operating over a switch-back

will spot the cars over the pockets and return them to the float for return movement to the mine after dumping.

All prepared coal will be screened and all pockets handling prepared sizes will be provided with screening chutes for conveying the screening from the loading chutes to the screening boxes. The latter are so constructed that they can be hauled to the re-screening plant and dumped, thus doing away entirely with the former practice of handling screenings by hand.

Thirty-eight trucks can load simultaneously. Three 20-ton scales, with 9 x 24-ft. platforms and provided with weightographs and an office on the second floor of the street end of the pocket are provided and all ground under or around the pocket has been paved with concrete.

### Samuel B. Crowell Dies

Samuel B. Crowell, former president of the National Retail Coal Merchants' Association, died December 9, following an operation. His home was at Edgcombe, Delaware County, Pa.

In the World War, Mr. Crowell was a member of the staff of Dr. H. A. Garfield, United States Fuel Administrator, and had charge of the retail distribution of coal throughout the United States. He was also president of the Pennsylvania Retail Coal Merchants' Association and vice president of the George B. Newton Coal Company.

### Production of Coal in November

The total production of soft coal for the country as a whole during the month of November with 24.8 working days, is estimated by the Bureau of Mines at 45,677,000 net tons as against 51,235,000 tons in October with 27.0 working days. The average daily rate of output in November was 1,842,000 tons. Compared with the average daily rate for October, this shows a decrease of 56,000 tons, or 3 percent.

The production of anthracite in the State of Pennsylvania during the month of November amounted to 6,042,000 net tons, a decrease of 2,290,000 tons from the output in October. The average daily rate of production in November was 252,000 tons, a decrease of 68,000 tons, or 21.3 percent, from the daily rate for October.

PRODUCTION OF BITUMINOUS AND ANTHRACITE IN NOVEMBER (Net Tons)

Month	Bituminous			Anthracite		
	Total production	No. of working days	Average per working day	Total production	No. of working days	Average per working day
September, 1929.....	44,515,000	23.3	1,832,000	6,792,000	24	283,000
October .....	51,235,000	27	1,898,000	8,332,000	26	320,000
November .....	45,677,000	24.8	1,842,000	6,042,000	24	252,000
November, 1928.....	46,788,000	24.3	1,925,000	7,322,000	24	305,000

### Coal Receipts at Head of Lakes Exceed 1928 Figures

While coal tonnage received at the Duluth-Superior harbor during the 1929 navigation season, exceeded that of 1928, it did not reach the record year of 1923 or the next high year, 1927, according to the season's report issued by Maj. P. C. Bullard, U. S. district engineer.

A total of 10,806,976 short tons were brought here by 1,204 ships, carrying an average cargo of 8,976 tons, compared to 10,340,437 tons by 1,158 ships, carrying an average cargo of 8,930 tons, in 1928, his report shows. The first cargo of coal for the season was brought by the steamer Emory L. Ford, arriving April 15, while the steamer William F. Fitch, on December 6, was the last to arrive.

The total soft coal and coke tonnage showed an increase of 717,385 tons, compared to last year, but hard coal decreased 250,846 tons, leaving a total increase for all coal of 466,539 tons compared to 1928. Coke was included with soft coal in records prior to 1929, the average total received here for the last eight years being 10,138,734 tons.

### Hughestown Colliery of Pennsylvania Coal Company to be Demolished

No. 9 colliery of Pennsylvania Coal Company at Hughestown, Pa., is to be demolished according to announcement made at Dunmore offices of the company. All coal taken from the mine there will be prepared for market at Butler colliery, Dupont, a short distance from No. 9 colliery. It is expected that the new system will be in operation within the next two months.

According to the company, it will reduce operating expense and insure steadier working conditions during 1930 and will not cut wages as reported. The colliery worked less than 50 percent of the time during the last year.

### Glen Alden Gets Pennsylvania Properties of Lehigh-Wilkes-Barre

The stockholders of the Glen Alden Coal Company and the Lehigh and Wilkes-Barre Coal Company have approved the sale of all the physical properties of the latter in Pennsylvania to Glen Alden for 676,700 shares of Glen Alden stock. At a current price of \$109 a share for the stock on the New York Curb Exchange, the transaction represents \$73,742,300.

Plans for the deal were announced on September 24 by W. W. Inglis, Glen Alden president.

About 81 percent of the stock of the Lehigh and Wilkes-Barre Coal Company has been held by the Lehigh and Wilkes-Barre Corporation, which acquired its

shares from the Reynolds syndicate for \$150 a share. The Reynolds syndicate purchased the holdings from the Central Railroad of New Jersey following the Reading Company segregation decree.

### Berwind-White Purchases Caples Mine

The Caples mine has been purchased by the Berwind-White Coal Mining Company. The property acquired is that of the Central Pocahontas Coal Company, near Welch, W. Va., on Browns Creek. It covers 18,000 acres and is a part of the original grant given to Robert Morris, financier of the Revolutionary War.

### Jeddo-Highland Company Takes Over Coxe Interests

The Jeddo-Highland Coal Company has announced that the breakers at Jeddo and Highland have been put in shape and that they can handle the coal from Tomhicken, Oneida and Derringer mines, after almost a year's work following the taking over of the Coxe mines.

The Lehigh Valley Coal Company had operated the Coxe tracts for more than 25 years. An expenditure of millions has been made in putting the Jeddo plants in shape to handle the increased tonnage, which will be 2,400 to 2,700 a day more than what it is now.

### General Coal Company To Handle Crozer Coals

Announcement has been made that after January 1, 1930, the Crozer Coals, heretofore handled by the Crozer-Pocahontas Company, Philadelphia, will be exclusively distributed by the General Coal Company, of that city. There will be no change in the ownership or management of the Crozer Coal and Coke Company, Powhatan Coal and Coke Company, Upland Coal and Coke Company, Page Coal and Coke Company, and the Peerless Coal and Coke Company, which companies have furnished the coal distributed by the Crozer-Pocahontas Company. Because of the affiliation of the Chicago, Wilmington & Franklin Coal Company and the General Coal Company in the smokeless coal field of West Virginia, the C. W. & F. Company will distribute, in the Chicago and western territory, the Crozer Coals heretofore handled by the Crozer-Pocahontas Company.

John Pyncheon and A. K. Zachary, who have been with the Crozer-Pocahontas Company in Chicago, will be affiliated with the sales organization of the Chicago, Wilmington and Franklin Coal Company, and W. A. Gericke, who has been with the Crozer-Pocahontas Company, will be affiliated with the General Coal Company's sales organization.

### Fire Destroys Elkhorn Colliery Tipple

Fire destroyed the Elkhorn Colliery tipple of the Mill Creek Coal and Coke Company at Maybeury, McDowell County, W. Va., November 25, causing damage estimated at \$100,000. The cause of the blaze was not determined.

### I. N. Bayless To Union Pacific

I. N. Bayless, superintendent of the Utah Fuel Company, at Castlegate, in Carbon County, has resigned to accept the position of assistant general manager of the Union Pacific Coal Company, at Rock Springs, Wyo. Mr. Bayless has been associated with the coal industry practically all his business life. He has managed properties in West Virginia and in Illinois besides holding positions in Utah.

### Brennan Heads Utah Fuel Company

W. D. Brennan, Dawson, New Mexico, manager of the Stag Canon branch of the Phelps-Dodge Corporation, has resigned to become president of the Utah Fuel Company, succeeding T. C. Keller. Gilbert Davis, who has been general manager, Colorado & Utah Coal Company, will succeed Mr. Brennan at Dawson.

### Pittsburgh Coal Exhibits

The Pittsburgh Coal Company had an interesting exhibit at the Power Show in New York, early in December. The exhibit consists of motion pictures, taken inside and outside the mines of the company, showing methods of mining, preparation loading, etc., of coal. The company also had on display various samples of its production together with "sink and float" demonstration of the washing process through which its coal is mechanically cleaned. The exhibit was under the supervision of C. A. Reed, combustion engineer of the company.

### New Firm of Wadleigh and Bailey

Francis R. Wadleigh, former Federal fuel administrator and consulting mining and fuels engineer of New York, and Ernest L. Bailey, formerly general superintendent of the Coal Mining Subsidiaries of Allied Chemical and Dye Corporation, have associated themselves, under the name of Wadleigh and Bailey, for the purpose of rendering a complete consulting and engineering service to the coal producing and fuel consuming industries and interested financial investors, with offices located at No. 1 Broadway, New York, and Southern Building, Washington, D. C.

The American Ceramic Society and the American Refractories Institute will hold their annual convention in Toronto, Canada, February 16-21.

## WITH THE MANUFACTURERS

### Westinghouse to Build One and a Half Million Dollar Engineering Laboratory

An expenditure of \$1,500,000 will be made by the Westinghouse Electric and Manufacturing Company in the construction of a central engineering laboratory and an addition to the present direct current power laboratory, both in East Pittsburgh. This has been announced by F. A. Merrick, Westinghouse president.

"The buildings will house one of the world's best equipped electrical laboratories, Mr. Merrick said. Generators big enough to supply electricity to a town of 10,000 people will be used merely for experiments. Artificial lightning for testing insulating materials will be produced by a high-voltage surge generator. Test circuits of almost any voltage and frequency will be provided for.

"Making artificial weather—hot or cold—will be every-day routine in the weathering rooms where sunshine or rain, winter cold or summer heat, will be produced for testing apparatus built for outdoor service. In another room any given set of atmospheric conditions of temperature, pressure, and humidity may be accurately reproduced.

"The new laboratory will eventually replace numerous smaller laboratories and experimental test sections now scattered throughout the plant, in keeping with the tendency towards consolidation in all branches of modern industry and will also provide many additional facilities. Laboratories all under one roof and under centralized supervision permit development work with greater facility and with less interference and delay by routine, manufacturing tests and crowded production schedules.

"Six upper floors of the new building will be used for engineering offices and the remaining floors will house miscellaneous experimental work. The active floor space will be about equally divided between engineering laboratory and office accommodation.

"The direct-current laboratory and the first floor of the taller building will have a head-room of over 20 feet, and will be provided with crane facilities for handling motors and power apparatus weighing as much as 15 tons. All of the power generating equipment will be installed in these high bays."

Work has already started on the laboratory, an 11-story structure 80 feet wide and 225 feet long. Adjacent to this building will be the 125-foot extension to the direct current laboratory.



W. S. Rugg, vice president of Westinghouse, turning the first shovelful of earth to start construction of the new engineering laboratory to be built in East Pittsburgh

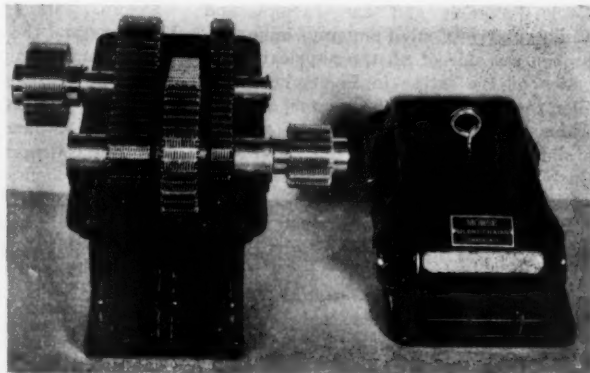
### Interest in Morse Chain Exhibit Necessitates Further Display

Because of the unusual interest displayed in the exhibit of the Morse Chain Company during the power show last month, substantially the same booth will be shown at the road show, to be held in Atlantic City, January 11 to 17. This will display the Morse silent chain drive in all the phases of its industrial application, and is remarkably informative, even to those of the engineering pro-

fession who feel that they have the subject of power transmission set-ups thoroughly mastered.

The Morse silent chain will be the principal feature of the exhibit, but the flexible coupling, single, double, and triple reduction speed reducers, and the ring and disc oilers will also be shown prominently. A silent chain drive will be set up in actual operation with the pitch travel synchronized with a Neon lamp which gives a stroboscopic effect, and graphically illustrates the 98.6 percent efficiency of these chains. The rocker joint action can thus be studied, and the smoothness of action, and dependability of power delivery will be apparent even to the eye of the layman.

One of the speed reducers will also be connected up to a motor having a Morse flexible coupling on the driving shaft. The action of both these devices can thus be examined in detail, and the application of them to individual industrial problems figured out. The Morse ring oiling device will be in operation under glass, which will make its functions easily understandable. The purpose of the ring oiler is to deliver clean oil at all times to the moving chain, thus doing away with the old splash system, which had several objectionable features, chief among which was possibility of grit and foreign matter being constantly thrown on the chain. The oiling devices, both disc and ring, do not disturb the sediment in the oil sump at all, taking as they do only the clean oil from the surface. A box of chain parts will complete the mechanical side of the exhibit.



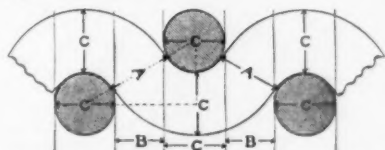
View of Morse speed reducer showing chain widths, and the arrangement of driving and drive shafts, and sprockets. Note the flexible couplings



### Ludlow-Saylor Has New Steel Wire Cloth

The Ludlow-Saylor Wire Co., of St. Louis, announce that they have perfected a 50 x 50 mesh steel wire cloth made of No. 33 W & M gauge (.0118-in. diameter) wires.

This is the heaviest 50 x 50 mesh steel wire cloth ever made. The diameter of the wires (.0118-in.) is .0036 in. larger (44 percent) than the nominal opening between wires as listed in their literature. This nominal opening is .0082 in.



Magnified section showing screen having wires larger than the nominal openings between wires.

The above sketch shows wires of larger diameter than the nominal opening between wires. It shows why the diagonal A, the available space between parallel wires through which transverse wires may pass, is considerably more than B, the nominal opening between wires.

The Ludlow-Saylor Wire Co. make a full line of wire cloth and woven wire screens in all grades and meshes, and in all commercial metals and alloys.

### Air-Cooled, Two-Stage Compressors

Ingersoll-Rand Company announces a new line of air-cooled, two-stage air compressors, known as the type 30. V-type belt drive is employed. Both motor and compressor have ball bearing.

The units are self-contained, the motor and compressor being mounted on a steel base, which is attached to the top of the air receiver. The latter, which is made

of heavy pressed steel, is built to withstand a working pressure of 200 pounds. With this arrangement, no special foundation is required for correct alignment of the compressor and motor. The compressor is ready to operate as soon as the electrical connections to the motor have been made and the crankcase filled with oil.

The intercooler is located behind the fan-type flywheel, and a constant current of circulating air is driven directly across the cooling coils. This reduces the temperature of the discharge air.

Automatic start and stop control, furnished as standard equipment, operates independently, but in conjunction with the unloader. When the pressure in the air receiver reaches a point at which the regulator is set to unload, the motor is automatically shut off. A centrifugal governor allows the air in the high-pressure cylinder and intercooler to exhaust through the crankcase. This prevents the compressor from starting against a load.

Honed cylinders and two oil control rings reduce the oil in discharge air to a minimum. Each piston is run into its respective cylinder, insuring a perfect oil seal.

The base of the compressor unit forms a reservoir for the oil, and no oil pump is required. A bayonet gauge gives positive indication of the amount of oil in the reservoir.

A self-cleaning air cleaner keeps dirt out of the compressor and requires no attention. The compressor is entirely enclosed, and no dirt can get into it to wear out the working parts.

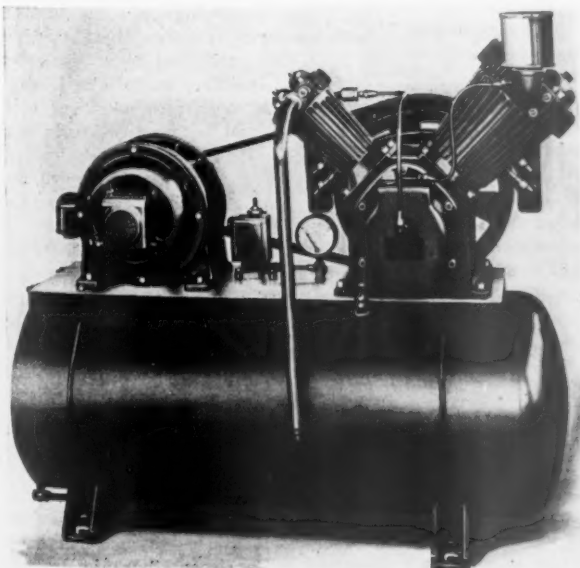
A balanced crankshaft eliminates destructive vibration.

This improved two-stage design reduces power from 10 to 30 percent. At the same time, less floor space is required.

It is built in four sizes:  $\frac{3}{4}$ ,  $1\frac{1}{2}$ , 3, and 5 horsepower. All sizes are built for a working pressure up to 200 pounds continuous duty.

A copy of bulletin 3060, describing the new compressor, can be obtained by addressing the Ingersoll-Rand Company, 11 Broadway, New York.

Ingersoll-Rand's new two-stage air compressor

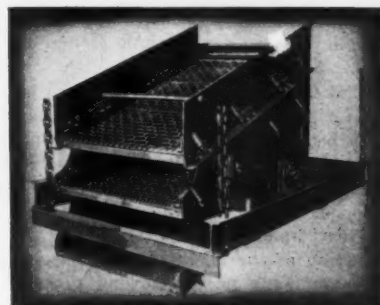


### Stephens-Adamson Announces a New Vibrator Screen

Builders and users of separation machinery for the screening of bulk materials have for years appreciated the advantages of continuous and rapid agitation of the aggregate for the purpose of causing the smaller size lumps to settle through the mass and pass the screen surface openings. High-speed pulsation causes constant shifting of the mass of material and aids in contacting all the aggregate with the screening surface.

The principle of vibration has been adapted to screening mechanisms for years with some success. Problems of design and construction have resulted in partial solution of difficulties.

In the production of labor-saving machinery for handling bulk products, the Stephens-Adamson Co., of Aurora, Ill., became interested and are now ready to announce the S-A Vibrator, a power actuated screen which S-A engineers be-



New vibrator screen designed by Stephens-Adamson Mfg. Co. for heavy duty separation

lieve to be a unit correctly designed and built to give satisfactory separating service through long periods. The ability to develop positive vibration has been incorporated in this screen as a fundamental feature. Along with this basic principle there also has been recognized the necessity of so constructing the ma-



Stephens-Adamson's new 16-page catalog on their vibrator screen for heavy duty

chine that it will withstand the constant vibration with no effects detrimental to the life of the equipment.

The screens are built in different widths and lengths ranging from 2 ft. wide by 4 ft. long to 5 ft. wide by 8 ft. long, all available in the single, double and triple deck assemblies. Four different rotor mechanisms are built for installation in the several assemblies selected according to the severity of duty.

Following strenuous factory tests, these screens were installed in actual stone plant service under severe operating conditions.

Operating results of successful installations substantiated the technical and practical features of design which attract particular attention to this S-A Vibrator as a screen of unusual merit.

A catalog describing the machine is ready for distribution. Within this bulletin are descriptions, illustrations and technical information with dimensions of each screen.

#### Roller Chain Data Book Issued by Link-Belt

Link-Belt Company, Indianapolis, Ind., has just published a new roller chain data book, No. 1257, which they claim is the most complete manual for properly selecting and applying chain yet developed.

This 96-page book illustrates the construction of the chains and wheels, and presents many pages showing practical applications of Link-Belt roller chain on light and heavy duty industrial drives, and on all types of machinery, tractors, trucks, farm implements, etc.

All data is clearly compiled to enable one to select the proper chain and wheels to suit individual conditions, and to figure costs. Also an additional feature of value is a presentation of lists of wheels up to 81 teeth. All pitches of chains are carried in stock.

This book is worthy of an important place in every engineer's and mechanical man's library. A copy will be sent gratis, if requested upon business letterhead.

#### Linde Oxygen Plant for Portland, Oreg.

The Linde Air Products Company announces the opening of an oxygen plant at 60 Knott Street, Portland, Oreg. This plant, which started operations on November 19, 1919, is located on a private siding on the Oregon Washington Railroad.

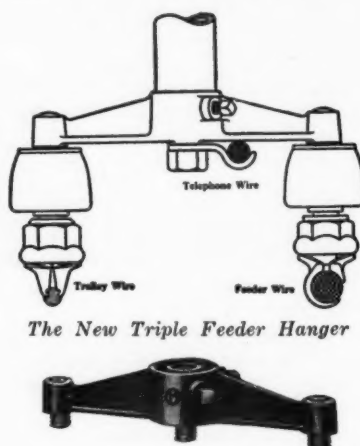
A. D. Davis is superintendent of the Portland Linde plant and D. F. Fox, whose headquarters are at 114 Sansome Street, San Francisco, Calif., is district superintendent. R. G. Dagget is division superintendent, with headquarters at 114 Sansome Street, San Francisco, Calif., also.

#### Triple Feeder Hanger Supports Three Circuits From a Single Support

To meet a problem present in many mining properties, the Ohio Brass Company, Mansfield, Ohio, has recently announced a triple feeder hanger, which can be accommodated to a variety of roof conditions and affords three points of suspension from a single roof attachment.

This new hanger may be attached to the mine roof by direct connection to the stud of a mine hanger, expansion bolt or other roof support; by fitting to the end of a vertical pipe; by suspension from an insulated hanger, where such insulation is necessary.

The boss of the triple feeder hanger accommodates any regular mine ceiling attachment with  $\frac{1}{2}$ -in. threads, or it may be secured to the end of a  $1\frac{1}{4}$ -in. pipe by means of two set screws mounted at



The New Triple Feeder Hanger

right angles. Thus it will be seen that almost any of the present suspensions can be utilized.

The operator who has several circuits to be strung through the haulageways will find this hanger economical, both as to material and installation cost. For instance, one of the outside studs may support the trolley wire from clamps and insulated hangers, the other outside stud can carry the feeder wire similarly supported. This leaves the center stud for a telephone wire suspended from a slip or other device. A combination that is being used under certain conditions is that of suspending the positive and negative D.C. feeders on the two outside studs, with the center one supporting a large three phase A.C. feeder cable.

#### Charles Piez Elected President A. S. M. E.

At the annual meeting of the American Society of Mechanical Engineers held in New York City on December 3, Charles Piez, chairman of the board,

Link-Belt Company, Chicago, began his term as president of the association—the largest engineering organization in the world. Mr. Piez is widely known as an engineer, a manufacturer and an executive.

#### New M-S-A Protective Hat

The Mine Safety Appliances Company, Pittsburgh, Pa., has recently placed a light-weight and durable, molded safety helmet on the market which is designed



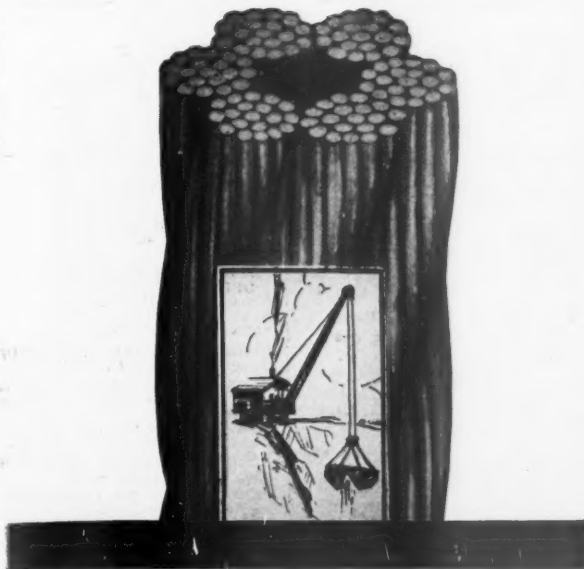
to prevent head injuries from falling materials. This new protective hat is particularly valuable for use in the metal mines and quarries where adequate head protection is paramount. The hat is absolutely waterproof, durable, well ventilated and strong enough to withstand severe blows. It is manufactured in standard hat sizes.

#### Fred D. Holdsworth, Sullivan Machinery Company Engineer, Dies

Fred D. Holdsworth, Engineer in Charge of Air Compressor Design for the Sullivan Machinery Company at its Claremont, N. H., plant from 1900 to 1928, died November 20. Mr. Holdsworth was born in Wales, Mass., October 23, 1867. He graduated from Worcester Polytechnic Institute in 1888 and, after experience as mechanical engineer with the Rhode Island Locomotive Works and with the G. F. Blake Company, afterwards Blake & Knowles, he joined the Sullivan staff in 1900, remaining at Claremont as mechanical engineer in charge of air compressor design until his retirement, about a year ago.

The development of the Sullivan Angle Compound Air Compressor, Portable Gasoline Engine Driven Air Compressor, and Electric Motor Driven Mine Car Air Compressor took place under his direction.

He was awarded nearly 50 patents connected with the development of various Sullivan machines. Mr. Holdsworth was a member of the American Society of Mechanical Engineers and had been secretary of the Green Mountain Branch.



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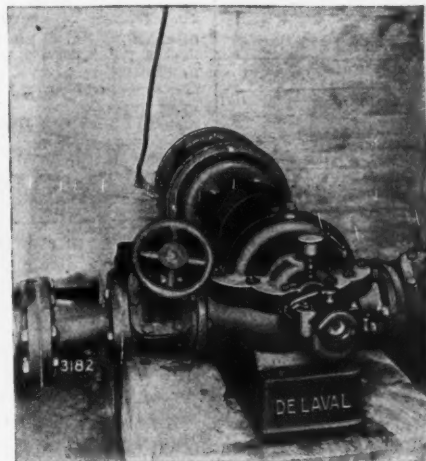
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**CASTINGS, GRAY IRON**  
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Vulcan Iron Works.

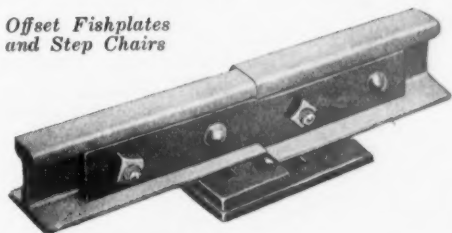
**CASTINGS, OPEN HEARTH, STEEL**  
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*Offset Fishplates  
and Step Chairs*



**G**OOD track, to prevent wear on rails and equipment, demands good joints. Where different size rails meet joints are particularly important. These joints can be made rigid and smooth, preventing wear and pounding or jar. Well made offset fishplates and step chairs hold the different size rails firmly in lateral and horizontal alignment thus preventing pounding, breakage of joints and lessening wear on flanges.

*Rails, Frogs, Switches, Stands, Mine Ties*

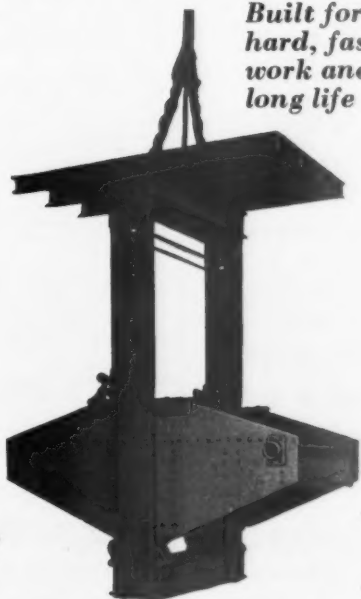
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**The West Virginia Rail Co.**  
Huntington, W. Va.



## HOLMES Heavy Duty Cages

*Built for  
hard, fast  
work and  
long life*



*Send for  
Bulletin  
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**Robt. Holmes & Bros., Inc.**  
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## MT. VERNON

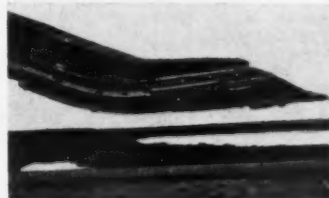


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**T**HIS pit car loader is adaptable to present mining systems and conditions. It is easily operated, allows selective loading, is sufficiently enclosed for protection and open for ready access and offers many advantages in its loading end (see below), adjustable forward truck, starting switches on both sides, adjustable balance, Diamond roller chain, etc. Send for details about this, the more complete loader.

**THE MT. VERNON CAR MFG. CO.**  
MT. VERNON, ILLINOIS

CONSTRUCTION DETAILS No. 8



*The Loader End is built low with a flat bill so it can be shoved under loose coal. A bumper in the rear for pushing by locomotive makes this arrangement unusually effective.*

*Mechanize without change  
of mining system*

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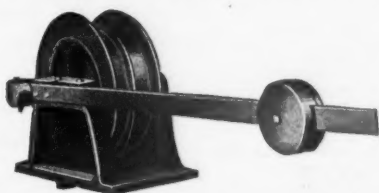
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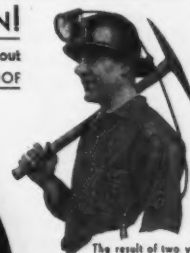
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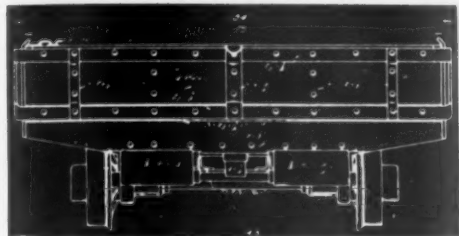
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**HOISTS, Room**  
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**HOISTS, Room and Gathering**  
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 Central Frog & Switch Co.  
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 General Electric Co.  
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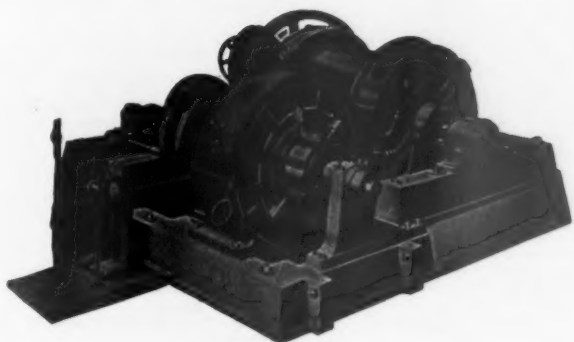
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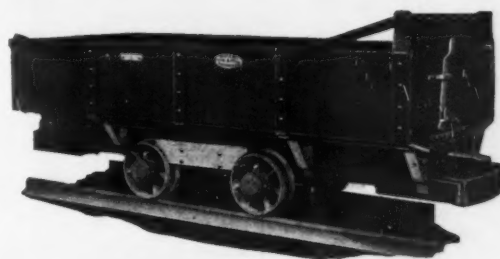
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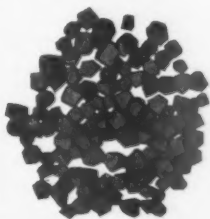
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Roebing's Sons Co., J. A.

**TIES (Steel, Mine)**

American Steel &amp; Wire Co.

Central Frog &amp; Switch Co.

**TILLER ROPE**

Roebing's Sons Co., J. A.

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Ayer &amp; Lord Tie Co.

**TIMBER PRESERVING EQUIPMENT**

Allis-Chalmers Mfg. Co.

Carnegie Steel Co.

**TIMBERS, STEEL MINE**

Carnegie Steel Co.

**TIPPLES**

American Coal Cleaning Corp.

The Jeffrey Mfg. Co.

Link-Belt Co.

Roberts &amp; Schaefer Co.

**TIPPLE EQUIPMENT**

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C. S. Card Iron Works Co.

The Jeffrey Mfg. Co.

Link-Belt Co.

Mining Safety Device Co.

Phillips Mine &amp; Mill Supply Co.

Roberts &amp; Schaefer Co.

United Iron Works, Inc.

**TIPPLE TRACK**

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Ingersoll-Rand Co.

**TORCHES, Brazing, Carbon Burning, Cutting, Lead Burning, Welding, Welding and Cutting**

Oxweld Acetylene Co.

**TRACK BRACES**

Central Frog &amp; Switch Co.

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Central Frog &amp; Switch Co.

C. S. Card Iron Works Co.

West Virginia Rail Co.

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**TRACKS, PORTABLE, RAIL, ETC.**

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Central Frog &amp; Switch Co.

West Virginia Rail Co.

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Central Frog &amp; Switch Co.

**TRACK (Portable, Assembled and Unassembled, Riveted or Bolted)**

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Central Frog &amp; Switch Co.

West Virginia Rail Co.

**TRACK SUPPLIES**

Carnegie Steel Co.

Central Frog &amp; Switch Co.

West Virginia Rail Co.

**TRAMWAYS, AERIAL**

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Standard Oil Co. (Ind.)

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**VALVES**

Ohio Brass Co.

**VALVES, Back Pressure, Pressure Reducing**

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Robinson Ventilating Co.

Westinghouse Electric &amp; Mfg. Co.

**VICES, Riggers**

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Link-Belt Co.

**WASHERIES**

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American Coal Cleaning Corp.

Link-Belt Co.

Roberts &amp; Schaefer Co.

**WEIGH BASKETS**

Link-Belt Co.

Roberts &amp; Schaefer Co.

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**WELDING APPARATUS, ELECTRIC ARC**

Ohio Brass Co.

Westinghouse Electric &amp; Mfg. Co.

**WELDING SUPPLIES**

Oxweld Acetylene Co.

Westinghouse Electric &amp; Mfg. Co.

**WELDING WIRE, Electric**

American Steel &amp; Wire Co.

Ohio Brass Co.

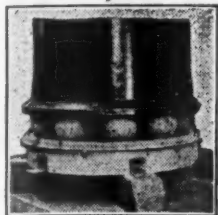
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**WELDING WIRE, Gas**

American Steel &amp; Wire Co.

Ohio Brass Co.





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C-1 Mill—10 Stamps.  
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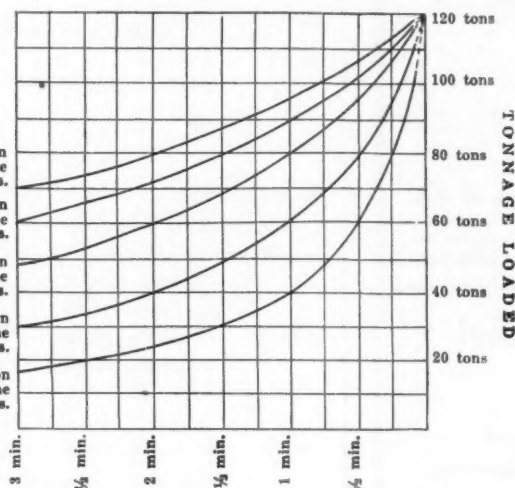
Curve of tonnage production with a decreasing time for the car change using 8-ton cars.

Curve of tonnage production with a decreasing time for the car change using 6-ton cars.

Curve of tonnage production with a decreasing time for the car change using 4-ton cars.

Curve of tonnage production with a decreasing time for the car change using 2-ton cars.

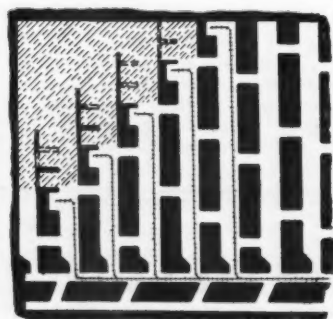
Curve of tonnage production with a decreasing time for the car change using 1-ton cars.



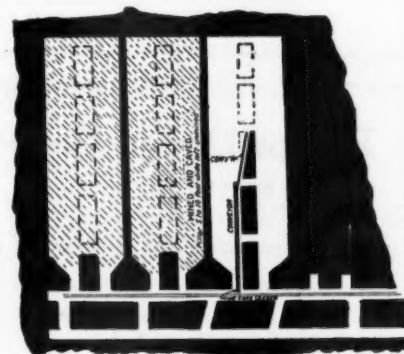
TIME OF CAR CHANGE

Curves showing relation between production, car capacity and time for single car changes

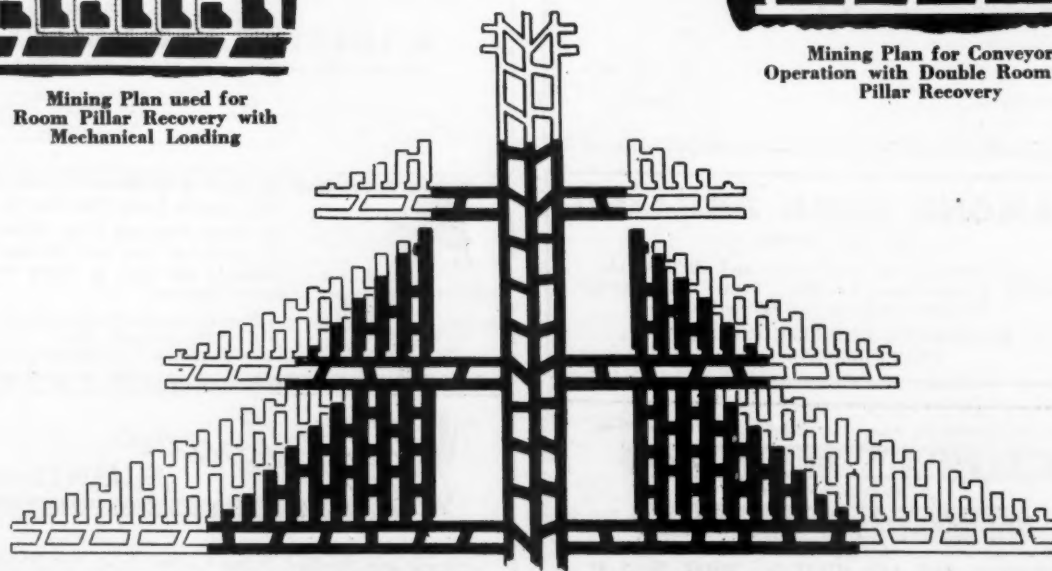
*THE NEW YEAR-BOOK pictures graphically how mechanization is being used and what it accomplishes under all conditions and all mining systems.*



Mining Plan used for Room Pillar Recovery with Mechanical Loading



Mining Plan for Conveyor Operation with Double Room and Pillar Recovery



How Mechanization Concentrates Mine Workings

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## THE AMERICAN MINING CONGRESS

841 MUNSEY BUILDING

WASHINGTON, D. C.



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## Watch for the INDUSTRY NUMBERS appearing during 1930

The complete story of different branches of the mining industry, featuring each time some large and representative producer, will appear in various issues of The Mining Congress Journal throughout the year. Everything will be told, from the economic aspects of branch of the industry described, through the administrative, personnel and safety policies to the practical methods of actual production of the company featured. This program will present possibly the most comprehensive picture ever drawn of the industry.

*These issues will include*

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ANTHRACITE	LEAD and ZINC
IRON	

*These in addition to the regular  
COAL EXPOSITION ISSUE*

FOLLOW THE MINING CONGRESS JOURNAL CLOSELY DURING 1930

# PNEUMATIC COAL SEPARATION Record

**1920-1925 — 9 Plants — 1,776,000 Tons**

**1926 — 8 Plants — 2,784,000 Tons**

**1927 — 10 Plants — 3,544,000 Tons**

**1928 — 20 Plants — 6,896,000 Tons**

**1929 { Annual Separating Capacity Sold and Installed as Follows 6,036,400 Tons**

\*American Coal Co. of Allegany County (Piedmont Mine), Widemouth, West Virginia.

Greenbrier Coal & Coke Co., McDowell, West Virginia.

Ashless Coal Sales Incorporated, Ravenna, Kentucky.

Merrill Coal Mines, Inc., Henlawson, West Virginia.

\*Central Alabama Coal Co., Kimberly, Ala.

\*Humphreys Coal & Coke Co., Greensburg, Pa.  
United Pocahontas Coal Co., Crumpler, West Virginia.

\*Central Pocahontas Coal Co., Anawalt, West Virginia.

Carbon Coal Co., Canada.

\*West Canadian Collieries Co., Ltd., Blairmore, Alberta, Canada.

Charbonnages de Mariemont, Belgium.

Charbonnages Henzies Pommerouel, Belgium.

Earl of Dudley's Baggeridge Colliery, Gospel End, Sedgley, England.

The Abermain & Stanford Merthyr Collieries, London, England.

Ladyshore Colliery Co., Ltd., Little Lever, Near Bolton, England.

Charbonnages de Petit-Try, Lambusart, Belgium.

Zaklady-Solvay W. Polace, Czecho Slovakia.

Bolsover Colliery Co., Ltd., Near Chesterfield, England.

Scarbofermo Colliery, Ltd., Krolewska Huta, Poland.

Essex Coal Company, Hocking, Ohio.

(\*) Denotes repeat orders.

**Total Annual Separation and Cleaning Capacity to Date ..... 21,180,400 Tons**

*Complete List for previous years shown in January, 1929, issue, Mining Congress Journal*

**AMERICAN**  
COAL CLEANING CORPORATION  
WELCH, W. VA.  
(Sutton, Steele & Steele Patents)

**Designers and Erectors of Pneumatic Coal Cleaning Plants**

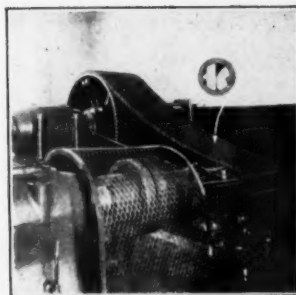
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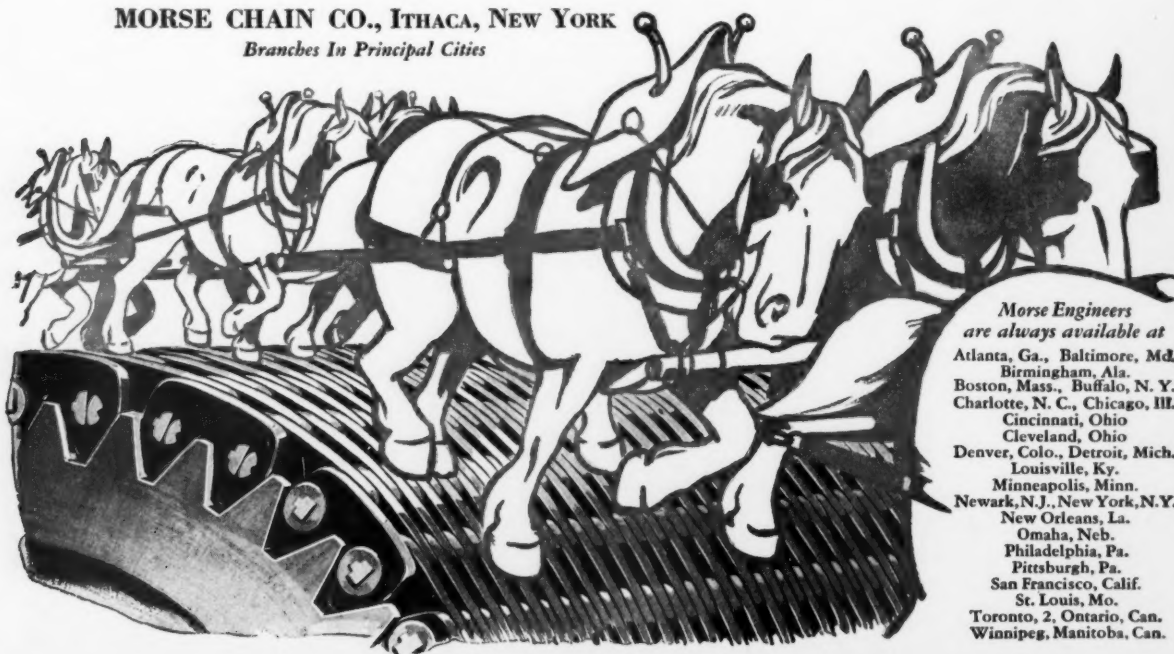


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